Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	003 K4.07	
	Importance Rating	3.2	

Knowledge of RCPS design feature(s) and/or interlock(s) which provide for the following: Minimizing RCS leakage (mechanical seals)

Proposed Question: Common 1

Which ONE (1) of the following components acts to limit Reactor Coolant System leakage when the vapor seal fails on a Reactor Coolant Pump?

(Assume the lower, middle and upper seals are intact and functioning properly.)

A. Rotating baffle and shaft hydrostatic bushing.

B. Shaft hydrostatic bushing and O-rings.

C. Seal breakdown coil and rotating seal face.

D. Controlled bleedoff check valve and stationary carbon rings.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Plausible because both components act to limit seal flow, however, given the conditions described these components manage gross seal leakage via multiple seal failures.

B. Incorrect. Plausible because both components act to limit seal flow, however, given the conditions described the O-rings only act as seals for individual seal package components.

C. Correct. Given the conditions, these components limit flow out the vapor seal.

D. Incorrect. Plausible because with a check valve failure the flow out a vapor seal could increase RCS leakage, however, the stationary carbon rings only partially act to limit flow through a seal face.

Technical Reference(s) SD-SO23-360, page 22 (Attach if not previously provided)
SO23-13-6, Attachment 2

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2XAR02-9 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 3

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	003 K1.01	
	Importance Rating	2.6	

Knowledge of the physical connections and/or cause-effect relationships between the RCPS and the following systems: RCP lube oil

Proposed Question: Common 2

With an RCP Oil Lift Pump control switch is selected to "Standby" position, which ONE (1) of the following statements describes the automatic operation of the Standby Oil Lift Pump?

The Standby Oil Lift Pump starts…

A. when the running pump oil flow is low.

B. when RCP speed is less than 90% and stops when RCP speed is greater than 90%.

C. 15 seconds after RCP is secured and stops when the RCP is started.

D. 15 seconds after RCP speed is less than 90% if redundant pump oil pressure is less than normal.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Plausible as the low oil lift flow alarm is initiated at 10.8 gpm, however, this alarm is dependent on pump speed.

B. Incorrect. Plausible as the low oil lift low flow alarm is initiated at 2 gpm and is dependent on pump speed, however, the pump does not automatically stop.

C. Incorrect. Plausible as it is partially correct, however, signal is speed dependent.

D. Correct. See reference.

Technical Reference(s) SD-SO23-360, page 29 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2XAR02-5 (As available)

Question Source: Bank # N2967
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 7
_____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	004 K3.02	
	Importance Rating	3.7	

Knowledge of the effect that a loss or malfunction of the CVCS will have on the following: PZR LCS

Proposed Question: Common 3

Given the following conditions:

- Unit 3 is in Mode 1 at 50% power at MOC.
- The Letdown Temperature Control Valve fails closed.
- All control systems are in Automatic.
- Assume NO operator or CVCS automatic actions occur.
- 3TV-0224B, Ion Exchanger Bypass Valve does **NOT** go to BYPASS.

Which ONE (1) of the following describes the effect on the Pressurizer Level Control System?

Actual Pressurizer level _____ and Pressurizer level setpoint _____.

A. remains the same; remains the same

B. lowers; remains the same

C. remains the same; lowers

D. lowers; lowers

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Plausible if failure to recognize actions associated with rising LD temperature.

B. Incorrect. Plausible and partially correct, however, the lowering of PZR level is a direct result of the changing level setpoint due to temperature..

C. Incorrect. Plausible and partially correct, however, with no auto actions RCS boron will continue to increase causing temp to lower and eventually driving down PZR level.

D. Correct. Letdown temp rises → RCS boron rises → RCS Tavg lowers → PZR level setpoint lowers → PZR level lowers.

Technical Reference(s) SD-SO23-390, page 42 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	005 A4.02	
	Importance Rating	3.4	

Ability to manually operate and/or monitor in the control room: Heat exchanger bypass flow control

Proposed Question: Common 4

Given the following conditions:

- Unit 2 is in MODE 5 on Shutdown Cooling (SDC).
- RCS temperature is being maintained constant at 150ºF.
- It is determined that SDC Pump (P-015) flow is too high for the current condition.

Which ONE (1) of the following is the correct alignment for reducing the flowrate through the pump?

A. Ensure HV-8161, SDC HX Bypass Normal Block Valve is closed and then throttle closed HV-8160, SDC HX Bypass Normal Flow Control Valve.

B. Ensure HV-0396, SDC HX Bypass Standby Flow Control Valve is closed and then throttle closed HV-8161, SDC HX Bypass Normal Block Valve.

C. Ensure HV-0396, SDC HX Bypass Standby Flow Control Valve is closed and then throttle closed HV-8160, SDC HX Bypass Normal Flow Control Valve.

D. Ensure HV-8160, SDC HX Normal Bypass Flow Control Valve is closed and then throttle closed HV-0396, SDC HX Bypass Standby Flow Control Valve.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Plausible because HV-8160 is throttled closed, however, flow would be totally blocked given valve configuration.

B. Incorrect. Plausible because HV-0396 is closed, however, HV-8161 is not designed to be throttled.

C. Correct. This is the guidance outlined in SO23-3-2.6, SDC Operations.

D. Incorrect. Plausible because this configuration would limit flow, however, HV-8160 is electrically blocked 10% open and cannot be fully closed and only one of the valves is normally in service.

Technical Reference(s) SO23-3-2.6, Step 6.2.7 (Attach if not previously provided)
SD-SO23-760, page 76
SO23-3-2.6, Attachment 1

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2XAR03-3 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 3,7,10
_____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	006 A1.05	
	Importance Rating	2.9	

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ECCS controls including: CCW flow (establish flow to RHR heat exchanger prior to placing in service)

Proposed Question: Common 5

Given the following conditions:

- Unit 3 is in MODE 5 with Shutdown Cooling (SDC) in service.
- RCS temperature is 190ºF.
- Train A SDC Heat Exchanger (HX) is in service and Train B SDC HX is in standby.

Which ONE (1) of the following identifies the impact to the standby HX?

The Train B SDC HX…

A. will heat up to RCS temperature due to slow leakby through the SDC outlet valve.

B. maintains ambient conditions until the SDC outlet valve is opened.

C. SDC inlet valve must remain closed to prevent overpressurizing the HX.

D. may undergo potential tube damage due to ambient cooldown while isolated.

Proposed Answer: A

Explanation (Optional):

A. Correct. See SO23-3-2.6, L & S 3.3.

B. Incorrect. Plausible because when the outlet valve is opened the temp will rise, however, ambient conditions will not be maintained due to leak by of the outlet valve.

C. Incorrect. Plausible if it is not known that the inlet valve is normally open, however, in this condition the HX cannot over pressurize because the CCW inlet is open.

D. Incorrect. Plausible because this could occur if proper alignment is unknown.

Technical Reference(s) SO23-3-2.6, L & S 3.3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2XAR03-8 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 7, 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	006 K2.04	
	Importance Rating	3.6	

Knowledge of bus power supplies to the following: ESFAS-operated valves

Proposed Question: Common 6

Unit 3 has experienced a Loss of Offsite Power and a LOCA.

Which ONE (1) of the following Motor Control Center combinations will be available to power their respective ESFAS Valves?

A. 3BRA; 3BRB; 3BRC

B. 3BDX; 3BHX; 3BMX

C. 3BJ; 3BY;3BZ

D. 3BD; 3BE; 3BF

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Plausible as 3BRA and 3BRB are powered from 1E Buses 3B04 and 3B06 respectively, however, 3BRC is powered from Bus 3B18 which is powered from Non-1E Bus 3A07.

B. Incorrect. Plausible as 3BDX and #3BHX are located in the Emergency Diesel Rooms for 3G002 and 3G003 respectively, however, 3BHX is powered from 3BDX which is powered from Non-1E Bus 3B14. 3BMX is powered from Non-1E Bus 3B13.

C. Correct. 3BJ and 3BZ are powered from 3B06 while 3BY is powered from 3B04.

D. Incorrect. Plausible as 3BD and 3BE are powered from 1E Bus 3B04, however, 3BF is powered from Bus 3B03 which is powered from Non-1E Bus 3A03.

Technical Reference(s) 2XE102 Handout (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 8

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	007 K5.02	
	Importance Rating	3.1	

Knowledge of the operational implications of the following concepts as the apply to PRTS: Method of forming a steam bubble in the PZR

Proposed Question: Common 7

Which ONE (1) of the following sets of conditions must be established within the Quench Tank prior to drawing a Pressurizer bubble?

A. Oxygen concentration must be maintained < 1% to prevent an explosive mixture from forming in the Quench Tank.

B. Oxygen concentration must be maintained < 5% in the event the Pressurizer or Reactor Head Vent Valves are opened.

C. Nitrogen pressure must be maintained > 1 psig to ensure a motive force for fluid to the Reactor Coolant Drain Tank.

D. Nitrogen pressure must be maintained > 5 psig to allow for purging of the Quench Tank.

Proposed Answer: A

Explanation (Optional):

A. Correct. This condition must be established in the QT prior to bubble formation.
B. Incorrect.
C. Incorrect. Plausible since the Quench Tank does gravity drain to the RCDT, however, the motive force is established by level (75 to 80%) and not pressure.
D. Incorrect. Plausible as purging is required if O_2 exceeds 1%, however, there is no established limit for N_2 pressure when drawing a bubble.

Technical Reference(s) SO23-3-1.4, Step 2.6 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	008 K1.05	
	Importance Rating	3.0	

Knowledge of the physical connections and/or cause-effect relationships between the CCWS and the following systems: Sources of makeup water

Proposed Question: Common 8

Given the following conditions:

- Unit 3 is in MODE 1 with Train A Component Cooling Water System in service.
- Normal makeup was initiated by the 22 in response to a low level in the Train A Surge Tank.
- The Non-Critical Loop Isolation valves automatically closed during the makeup evolution.

Which ONE (1) of the following caused the Non-Critical Loop Isolation?

A. CCW Rad Monitor RE-7819 detected radiation in the Non-Critical Loop.

B. The Train A Component Cooling Water Surge Tank was overfilled.

C. A Safety Injection Actuation Signal has occurred.

D. Low suction pressure on the operating CCW Pump.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Plausible because this detector does monitor the radiation levels in the Non-Critical loop (NCL), however, it is alarm and indication only.

B. Correct. Overfilling of the surge tank fills the reference leg and creates a low-low level condition that shuts the NCL valves.

C. Incorrect. Plausible because the NCL valves do respond to ESFAS signals, however, it is a CIAS that will close these valves.

D. Incorrect. Plausible because this feature was once incorporated in the CCW System..

Technical Reference(s) SO23-13-7, Attachment 1 (Attach if not previously provided)
SD-SO23-690, page 8

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 7, 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	008 A3.05	
	Importance Rating	3.0	

Ability to monitor automatic operation of the CCWS, including: Control of the electrically operated, automatic isolation valves in the CCWS

Proposed Question: Common 9

Given the following conditions:

- Unit 2 has tripped from 100% power.
- Containment pressure is 3.6 psig and slowly rising.
- No operator actions have been taken.

Which ONE (1) of the following identifies the automatic actions of the Component Cooling Water System?

A. SWC Outlet Valves from the standby CCW Heat Exchanger close.

B. CCW Supply and Return Lines to the Containment Chillers open.

C. CCW Non-Critical Loop Isolation Valves close.

D. SDC Heat Exchangers CCW Outlet Valves open.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Plausible because the standby loops CCW and SWC Pumps will be off, however, a SIAS will start the CCW Pumps in both trains which will open the SWC valves.

B. Incorrect. Plausible because a high Containment pressure opens the Emergency Cooling Unit (ECU) CCW valves, however, the Containment Chillers are cooled by TPCW.

C. Correct. A CIAS signal will close the NCL Valves.

D. Incorrect. Plausible because a high Containment pressure will open the valves, however, current pressure is insufficient to create a CSAS signal.

Technical Reference(s) SD-SO23-400, Section 2.1.5.2 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2XBL01- (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	010 K1.05	
	Importance Rating	3.4	

Knowledge of the physical connections and/or cause-effect relationships between the PZR PCS and the following systems: PRTS

Proposed Question: Common 10

Saturated steam from the Pressurizer at 2000 psia is leaking through the Pressurizer Safety Valve to the Quench Tank. Quench Tank pressure is being maintained at 50 psia.

Which ONE (1) of the following is the temperature and phase of the fluid entering the Quench Tank?

A. 281ºF; wet steam

B. 298ºF; wet steam

C. 330ºF; saturated steam

D. 340ºF; superheated steam

Proposed Answer: A

Explanation (Optional):

A. Correct.

B. Incorrect. Plausible as this is the correct value if the QT pressure is corrected to gauge pressure (65 psia).

C. Incorrect. Plausible as this is the constant entropy line from 50 psia up to the saturation curve.

D. Incorrect. Plausible as this is the constant enthalpy line from 2000 to 50 psia.

Technical Reference(s) CE Steam Tables (Attach if not previously provided)

Proposed references to be provided to applicants during examination: Steam Tables

Learning Objective: 2XAR02- (As available)

Question Source: Bank # 75643
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 5

Comments:
Modified Distractors C & D for better plausibility.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	012 A3.02	
	Importance Rating	3.6	

Ability to monitor automatic operation of the RPS, including: Bistables

Proposed Question: Common 11

Which of the following Reactor Protection System bistables will automatically change state upon loss of power to an individual Core Protection Calculator?

A. High LPD and low DNBR

B. Low DNBR and high linear power

C. High LPD and high linear power

D. High log power and low DNBR

Proposed Answer: A

Explanation (Optional):

A. Correct.
B. Incorrect. Plausible as low DNBR is correct.
C. Incorrect. Plausible as high LPD is correct.
D. Incorrect. Plausible as low DNBR is correct.

Technical Reference(s) SD-SO23-710, pages 5, 8 and 11 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2XCR02-3 (As available)

Question Source: Bank # ____
Modified Bank # ____ (Note changes or attach parent)
New X

Question History: Last NRC Exam ____

Question Cognitive Level:	Memory or Fundamental Knowledge	X
	Comprehension or Analysis	

10 CFR Part 55 Content:	55.41	2, 6

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	012 K4.04	
	Importance Rating	3.1	

Knowledge of RPS design feature(s) and/or interlock(s) which provide for the following: Redundancy

Proposed Question: Common 12

Which ONE (1) of the following statements describes the response of the Reactor Protection System to a loss of Vital AC Bus Y04?

A. Only two Reactor trip breakers will open because their corresponding trip path deenergizes and the Reactor WILL trip.

B. Only two Reactor trip breakers will open because they share the instrument AC power supply and the Reactor WILL NOT trip.

C. Four Reactor trip breakers will open because 2 trip paths will deenergize and the Reactor WILL NOT trip.

D. Four Reactor trip breakers will open because 2 trip paths will deenergize and the Reactor WILL trip.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Plausible because two trip paths will deenergize upon loss of the vital bus, however this is accompanied by the opening of 4 RTBs.

B. Incorrect. Plausible because with 4 vital buses and eight RTBs it is implied that two breakers receive power from each bus, however, it is the trip path de-energization that opens 4 breakers.

C. Correct.

D. Incorrect. Plausible at it is partially correct, however, two trip paths deenergize.

Technical Reference(s) SO23-13-18, Attachment 4 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 6
_____

Comments:
St. Lucie Bank - Modified Distractors A & D for better plausibility

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	013 K3.01	
	Importance Rating	4.4	

Knowledge of the effect that a loss or malfunction of the ESFAS will have on the following: Fuel

Proposed Question: Common 13

Given the following conditions:

- A LOCA has occurred.
- RCS pressure is 100 psig.
- All LPSI pumps are tripped.
- HPSI Pump P-018 is operating as designed.
- All other HPSI pumps are tripped.
- Reactor Vessel Plenum Level is 20%.

If this condition continues, which ONE (1) of the following describes the effect on the fuel assemblies?

A. Fuel failure will not occur. Minimum safety function requirements are met.

B. Fuel failure will not occur. SIT injection will maintain core cooling.

C. Fuel failure may occur. Minimum safety function requirements are NOT met.

D. Fuel failure may occur. Minimum safety function requirements are met, but the break is too large for a HPSI pump to provide core cooling.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Safety Function requires 1 full train of ECCS.

B. Incorrect. SIT injection design basis is for refill on a LBLOCA with LOOP. For this event, they have already performed their design function.

C. Correct.

D. Incorrect. Minimum Safety Functions are NOT met with less than 1 full train of ECCS.

Technical Reference(s) DBD (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # N127141
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam SONGS 2005

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	013 G2.2.22	
	Importance Rating	3.4	

Equipment Control Knowledge of limiting conditions for operations and safety limits.

Proposed Question: Common 14

With Unit 2 operating at 100% power, which ONE (1) of the following conditions would place the Unit in a Technical Specification one (1) hour Limiting Condition of Operation required entry?

A. A loss of three (3) Matrix Logic channels due to a common power source failure.

B. EFAS-1 Steam Generator ΔP high trip channel is INOPERABLE.

C. A LPSI Pump is declared INOPERABLE following flow testing.

D. RWST temperature drops to 38ºF during a cold snap.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Plausible because of ESFAS components affected, however, this is a 48 hour ACTION (TS 3.3.6.A).

B. Correct. Place the Functional Unit in bypass in 1 hour (TS 3.3.5.B).

C. Incorrect. Plausible as this is a 7 day ACTION for LPSI but a 1 hour ACTION for HPSI (TS 3.5.2.A).

D. Incorrect. Plausible because the surveillance must be performed with ambient air temperature <40ºF, however, this is an 8 hour ACTION (TS 3.5.4.A).

Technical Reference(s) Tech Spec 3.3.5.B (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # _____

Modified Bank # _____ (Note changes or attach parent)

New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 10
_____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	022 A2.04	
	Importance Rating	2.9	

Ability to (a) predict the impacts of the following malfunctions or operations on the CCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of service water

Proposed Question: Common 15

Given the following conditions:

- Unit 3 in MODE 2.
- Turbine Plant Cooling Water flow to the running Containment Chiller is blocked.

Which ONE (1) of the following identifies

a.) The impact on the Containment Cooling System?

b.) What action should be taken to mitigate the situation?

A. a. Containment Chiller trips on low TPCW Supply pressure.
b. Place the Containment Emergency Cooling Units in service when average Containment average air temperature reaches 100ºF per SO23-1-4, Containment Normal Heat Removal.

B. a. Containment Chill Water Pump trips on Chiller high condenser pressure.
b. Place the Containment Emergency Cooling Units in service when Containment average air temperature reaches 105ºF per SO23-1-4.1, Containment Emergency Cooling.

C. a. Containment Chiller trips on low TPCW Supply pressure.
b. Place the Standby Containment Chiller in service when Containment average air temperature reaches 100ºF per SO23-1-4, Containment Normal Heat Removal.

D. a. Containment Chill Water Pump trips on low suction pressure.
b. Place the Standby Containment Chiller in service when Containment average air temperature reaches 105ºF per SO23-1-4.1, Containment Emergency Cooling.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Plausible as the reason for tripping is correct; however, the ECUs are placed in service at 105ºF per SO23-1-4.1.

B. Incorrect. Plausible as the Containment ECUs are directed to be placed in service at 105ºF and the Chiller will trip on high condenser pressure of 161 psig due to a loss of cooling, however, the trips associated with the Chill Water Pumps are low suction pressure, low discharge flow, or a CW Containment Isolation Valve closing.

C. Correct. For the conditions given this is the correct trip and desired action.

D. Incorrect. Plausible as the CW pump will trip on low suction pressure but this parameter is not impacted by the loss of TPCW. Placing the ECUs in service at 105ºF per SO23-1-4.1 is correct.

Technical Reference(s) SO23-1-4, Step 6.15 (Attach if not previously provided)
SD-SO23-770, page 33

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2XAL09- (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 9, 10
_____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	026 K2.02	
	Importance Rating	2.7	

Knowledge of bus power supplies to the following: MOVs

Proposed Question: Common 16

Which ONE (1) of the following is the power supply to 2HV-9367, Train A Containment Spray Header Isolation Valve?

Motor Control Center…

A. 2B09

B. 2BE

C. 2B08

D. 2BX

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Plausible since 2B09 is located in the 63' Penetration Building, however it is powered from Non-1E Bus 2A09.

B. Correct. 2BE is located in the 50' Control Building and powered from 2B04.

C. Incorrect. Plausible since 2B08 is located in the 63' Penetration Building, however it is powered from Non-1E Bus 2A09.

D. Incorrect. Plausible since 2BX is located in the 50' Control Building, however it is powered from Non-1E Bus 2B16.

Technical Reference(s) SD-SO23-740, page 63 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2XAR07- (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 8

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	039 K3.06	
	Importance Rating	2.8	

Knowledge of the effect that a loss or malfunction of the MRSS will have on the following: SDS

Proposed Question: Common 17

Given the following conditions:

- Unit 2 is in MODE 2 at 1% power.
- 2PT-8239, Main Steam Pressure Transmitter input to Steam Bypass Control System (SBCS) fails low.

Which ONE (1) of the following identifies the effect on the SBCS?

The Master Controller…

A. indicated pressure (red pen) goes to 650 psi.

B. setpoint (black and white pen) goes to 650 psi.

C. indicated pressure (red pen) goes to 1000 psi.

D. setpoint (black and white pen) goes to 1000 psi.

Proposed Answer: A

Explanation (Optional):

A. Correct.

B. Incorrect. Plausible as this is the correct response for both PZR pressure instruments failing high.

C. Incorrect. Plausible given the power level conditions in the Stem. If a steam pressure transmitter fails high, there is no effect on the Master Controller because it is a “low select” signal. If SBCS control is thought to be “high select” then this would be an appropriate response.

D. Incorrect. Plausible as this is the correct response for a steam flow instrument failing low.

Technical Reference(s) SD-SO23-175, Figures 9 & 13 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2XIR05- (As available)

Question Source: Bank # N7713
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 4, 7
_____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	059 G2.4.6	
	Importance Rating	3.1	

Emergency Procedures / Plan Knowledge symptom based EOP mitigation strategies.

Proposed Question: Common 18

Which ONE (1) of the following describes the mitigation strategy for SO23-12-6, Loss of Feedwater?

A. Trip all RCPs; Attempt feedwater restoration; Control Pressure, Inventory and Heat Removal in the Functional Recovery Guidelines; Cooldown as required.

B. Trip all but 2 RCPs; Attempt feedwater restoration; Depressurize Steam Generators; Control Pressure, Inventory and Heat Removal.

C. Trip all RCPs; Minimize inventory loss; Attempt feedwater restoration; Control Pressure, Inventory and Heat Removal; Cooldown as required.

D. Trip all but 2 RCPs; Minimize inventory loss; Initiate cooldown at maximum rate; Control Pressure, Inventory and Heat Removal.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Plausible because all steps are appropriate with the exception of entering the FRGs for Safety Function control.

B. Incorrect. Plausible because the trip 2 RCPs / leave 2 RCPs running is used throughout the ERGs. Depressurizing the SGs is appropriate if a Condensate Pump is available for service.

C. Correct.

D. Incorrect. Plausible because it contains correct components of the mitigation strategy, however, cooldown is only required if necessary and all RCPs must be tripped.

Technical Reference(s) SO23-14-6, Attachment 1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2TA707- (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	061 K5.03	
	Importance Rating	2.6	

Knowledge of the operational implications of the following concepts as the apply to the AFW: Pump head effects when control valve is shut

Proposed Question: Common 19

Given the following conditions:

- Unit 2 was in MODE 2 at 1% power when a Reactor trip occurred.
- Steam Generator E-088 is at 21% narrow range level and 720 psia.
- Steam Generator E-089 is at 20% narrow range level and 730 psia.

Which ONE (1) of the following identifies the discharge pressure of each Steam Generators Auxiliary Feedwater Pump?

AFW Pump P-141 is at _____. AFW Pump P-504 is at _____.

A. ~940 psig; ~930 psig

B. ~1300 psig; ~930 psig.

C. ~940 psig; ~1300 psig.

D. ~1300 psig; ~1300 psig.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Plausible as discharge pressure selected corresponds to full AFW Pump flow with the given SG Pressure.

B. Incorrect. Plausible as discharge pressure selected corresponds to full AFW Pump flow with the given SG Pressure.

C. Incorrect. Plausible as discharge pressure selected corresponds to full AFW Pump flow with the given SG Pressure.

D. Correct. With the conditions stated, both AFW Pumps are at their respective shutoff heads.

Technical Reference(s) SD-SO23-780, page11 (Attach if not previously provided)
SD-SO23-780, Figure 13

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2XPR07- (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 4, 7, 8

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	061 A3.05	
	Importance Rating	2.5	

Ability to monitor automatic operation of the AFW, including: Recognition of leakage, using sump level changes

Proposed Question: Common 20

Which ONE (1) of the following sets of sump level alarms could be used to identify Auxiliary Feedwater System leakage?

A. Penetration, Component Cooling Water

B. Storage Tank, Containment

C. Safety Equipment Building, Control Building

D. Storage Tank, Penetration

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Penetration Building is on the other side of Containment from the AFW penetrations.
B. Correct. System leakage could occur in these areas.
C. Incorrect. Safety Equipment Building is adjacent to the AFW penetrations, however, the piping does not pass through there.
D. Incorrect. Penetration Building is on the other side of Containment from the AFW penetrations.

Technical Reference(s) SD-SO23-670, Figure 2 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 4, 9

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	062 K4.06	
	Importance Rating	2.9	

Knowledge of ac distribution system design feature(s) and/or interlock(s) which provide for the following: One-line diagram of 6.9kV distribution, including sources of normal and alternative power

Proposed Question: Common 21

Which ONE (1) of the following sets of conditions must be met in order for a 6.9 kV bus to automatically transfer from the Unit 2 Auxiliary Transformer to the Unit 2 Reserve Auxiliary Transformer?

A. 2XR3 energized with supply breaker in AUTO.
2XR3 is not supplying 3XR3.
2XU2 and 2XR3 lockout relays are reset.

B. 2XR2 energized with supply breaker in AUTO.
2XR2 is not supplying 3XR2.
2XU2 and 2XR2 lockout relays are reset.

C. 2XR1 energized with supply breaker in AUTO.
2XR1 is not supplying 3XR1.
2XU1 and 2XR1 lockout relays are reset.

D. 2XR3 energized with supply breaker in AUTO.
2XR3 is not supplying 3XR3.
2XU1 and 2XR3 lockout relays are reset.

Proposed Answer: A

Explanation (Optional):

A. Correct.
B. Incorrect. Plausible because the general conditions are met, however, 2XR2 is not available for cross tying to 2XU2.
C. Incorrect. Plausible because the general conditions are met, however, 2XR1 and 2XU1 are not the source of power for the RCP buses.
D. Incorrect. Plausible because the general conditions are met, however, 2XU1 is not the source of power for the RCP buses

Technical Reference(s) SD-SO23-120, Figures 1 & 3 (Attach if not previously provided)
SD-SO23-120, page 26

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	063 G2.2.22	
	Importance Rating	3.4	

Equipment Control Knowledge of limiting conditions for operations and safety limits.

Proposed Question: Common 22

Given the following conditions:

- Current date and time are June 18 at 1300 hours.
- It was just determined that the 92 Day Class Battery Surveillance Test was not performed on Channel C within the required 1.25 interval.
- The Allowed Completion Time expired at 0700 today.
- The test will take an additional 12 hours to complete.
- All other surveillance tests are current.

Which ONE (1) of the following identifies when Channel C should be declared INOPERABLE?

A. June 18th at 0700 hours; Commence a plant shutdown at that time.

B. June 18th at 1300 hours; Immediately commence a plant shutdown.

C. Sept 18th at 1300 hours; Complete the surveillance test by Sept 19th at 1300 or commence plant shutdown at that time.

D. Sept 19th at 1300 hours; Commence plant shutdown at that time unless the surveillance test is completed before then.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Plausible but not required per Tech Spec SR 3.0.3.
B. Incorrect. Plausible but not required per Tech Spec SR 3.0.3.
C. Incorrect. Plausible but not required per Tech Spec SR 3.0.3.
D. Correct.

Technical Reference(s) Tech Spec SR 3.0.3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # N56578
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 10
_____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	064 K6.07	
	Importance Rating	2.7	

Knowledge of the effect of a loss or malfunction of the following will have on the ED/G system: Air receivers

Proposed Question: Common 23

Which ONE (1) of the following identifies the impact to an Emergency Diesel Generator's Starting Air System when the outlet valve from one pair of air receivers is isolated?

A. One Air Start Motor on each diesel continues to function.

B. Both sets of Air Start Motors on one diesel continue to function.

C. One set of Air Start Motors on each diesel continue to function.

D. Both sets of Air Start Motors on both diesels continue to function.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Plausible because there are 4 Air Start Motors per diesel, however, their air supply is in series and they operate as a pair.

B. Incorrect. Plausible because the EDGs are coupled and when one starts they should both turnover, however, the starting air system is split between EDGs.

C. Correct.

D. Incorrect. Plausible because a cross connect valve is available, however, this valve is normally closed and each pair of receivers supplies a set of air start motors of each diesel.

Technical Reference(s) From SD-SO23-750, Figure V-1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 8

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	073 K4.01	
	Importance Rating	4.0	

Knowledge of PRM system design feature(s) and/or interlocks which provide for the following: Release termination when radiation exceeds setpoint

Proposed Question: Common 24

Which ONE (1) of the following is the effect of a high radiation detected by RE-7865, Plant Vent Stack Wide Range Radiation Monitor when it is aligned to the Plant Vent Stack?

A. Secures Continuous Exhaust Fans A-310, A-311 and A-312.

B. Initiates a Containment Purge Isolation Signal (CPIS).

C. Closes only the Outside Containment Purge Isolation Valves.

D. Closes HV-7202, Waste Gas Discharge Isolation Valve.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Plausible because this action is related to the closure of the Waste Gas Discharge valve, however, this signal originates from RE-7808

B. Incorrect. Plausible because this rad monitor will isolate the outside Containment Purge Stack Valves, however, it does not input into the CPIS circuitry.

C. Incorrect. Plausible because with this rad monitor aligned to the Containment Purge Stack it will isolate these valves.

D. Correct.

Technical Reference(s) SD-SO23-690, page 9 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2XRR08- (As available)

Question Source: Bank # N3139
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 11
_____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	076 K2.08	
	Importance Rating	3.1	

Knowledge of bus power supplies to the following: ESF-actuated MOVs

Proposed Question: Common 25

Which ONE (1) of the following describes the power supply arrangement for the Salt Water Cooling Valves?

CCW Heat Exchanger SWC Normal Outlet Valves (HV-6495 and HV-6497) are powered from _____ and Saltwater Emergency Discharge Valves (HV-6494 and HV-6496) are powered from _____.

A. 50' Control Building MCCs BY and BZ; 7' Turbine Building MCC BK

B. 7' Turbine Building MCC BK ; 50' Control Building MCCs BY and BZ

C. 7' Turbine Building MCC BM; 7' Turbine Building MCC BK

D. 50' Control Building MCC BY; 50' Control Building MCC BZ

Proposed Answer: A

Explanation (Optional):

A. Correct. Despite the "emergency" nomenclature, HV-6494 and HV-6496 are powered from a Non-1E MCC.

B. Incorrect. Plausible given the nomenclature used for the valves, however, the normal valves are 1E powered and the emergency valves are Non-1E powered.

C. Incorrect. Plausible as this partially correct and the mnemonic for MCC BM is "by the mountains" which is the next closest MCC to valves HV-6495 and HV-6497.

D. Incorrect. Plausible because both of these MCCs are 1E powered.

Technical Reference(s) SD-SO23-410, page 18 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2XB102- (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 4, 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	076 A2.01	
	Importance Rating	3.5	

Ability to (a) predict the impacts of the following malfunctions or operations on the SWS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of SWS

Proposed Question: Common 26

Given the following conditions:

- Unit 2 is in MODE 1.
- Train A Component Cooling Water (CCW) Pump P-025 is in service.
- Train A Salt Water Cooling (SWC) Pump P-112 is in service.
- Annunciator 64A55, SWC TRAIN A FLOW TROUBLE is in alarm.

Which ONE (1) of the following:

a.) Identifies the impact on the Salt Water Cooling System?

b.) What action should be taken to mitigate the situation?

A. a. CCW Heat Exchanger Salt Water differential pressure is high.
b. Start SWC Pump P-304 per SO23-2-8, SWC System Operation.

B. a. SWC Pump P-112 discharge pressure is low.
b. Transfer CCW to Train B per SO23-13-7, Loss of CCW/SWC.

C. a. CCW Heat Exchanger Salt Water Outlet pressure is low.
b. Transfer CCW to Train B per SO23-13-7, Loss of CCW/SWC.

D. a. SWC System return header pressure is low.
b. Start SWC Pump P-304 per SO23-2-8, SWC System Operation.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Plausible because a high ΔP would require adjustment of SWC flow, however, this is done per SO23-2-8.1, Section for Infrequent/Abnormal Operation of SWC System.

B. Incorrect. Plausible because the mitigation action is correct, however, the low pressure alarm is off the HX not off the pump.

C. Correct. This is the correct action for the situation.

D. Incorrect. Plausible because the mitigation action would be correct if plant conditions allowed, however, the SWC System has a return header pressure high alarm which is related to outfall collapse.

Technical Reference(s) SD-SO23-410, Figure 1 (Attach if not previously provided)
SO23-13-7, Step 14
SO23-15-64A55, page 133

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2XB102- (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 4, 7, 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	078 G2.1.23	
	Importance Rating	3.9	

Conduct of Operations: Ability to perform specific system and integrated plant procedures during all modes of plant operation.

Proposed Question: Common 27

During normal power operation, the LEAD Instrument Air Compressor trips and the Standby Compressors fail to start. Instrument air pressure decreases to approximately 70 psig, where it stabilizes. Liquid nitrogen tank is at low level.

Which ONE (1) of the following actions should be taken?Manually initiate nitrogen backup to restore instrument air pressure per SO23-1-1, Instrument Air System Operation.

B. Evaluate an orderly shutdown of the affected Unit (s) to HOT STANDBY per SO23-13-5, Loss of Instrument Air.

C. Trip the Reactor and Turbine and perform SO23-12-1, Standard Post Trip Actions.

D. Immediately cross-tie instrument air with respiratory and service air per SO23-1-2, Respiratory and Service Air System Operation.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Plausible because nitrogen supplies the IA system, however, this action occurs automatically at ~83 psig IA pressure. Procedurally, low backup N_2 levels require isolation of the N_2 supply.

B. Correct. This action is required when pressure cannot be restored within 24 hours

C. Incorrect. Plausible because this action is required in MODES 1 & 2 when IA pressure is < 60 psig.

D. Incorrect. Plausible because the systems can be cross-connected, however, this action occurs automatically at ~88 psig IA pressure.

Technical Reference(s) SO23-13-5, page 9 (Attach if not previously provided)
SO23-1-1, Attachment 22

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2AO705- (As available)

Question Source: Bank # N5852
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 7, 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	103 A3.01	
	Importance Rating	3.9	

Ability to monitor automatic operation of the containment system, including: Containment isolation

Proposed Question: Common 28

A Containment Isolation Actuation Signal has occurred.

Which ONE (1) of the following sets of valve closed indications could be used to make that determination?

A. HV-9920, Containment Normal Cooling System Supply Isolation Valve.
HV-9304, Containment Emergency Sump Outlet Isolation Valve.
HV-8205, Steam Generator E-088 Main Steam Isolation Valve.

B. HV-9823, Containment Mini-Purge Supply Isolation Valve.
HV-5437, Nitrogen to Containment Isolation Valve.
HV-6211, Non-Critical Loop Containment Isolation Valve.

C. HV-9825, Containment Mini-Purge Exhaust Isolation Valve.
HV-4714, Steam Generator E-088 AFW Containment Isolation Valve.
HV-9971, Containment Normal Cooling System Return Isolation Valve.

D. HV-9336, SDC to LPSI Pump Suction Containment Isolation Valve.
HV-9205, Letdown Containment Isolation Valve.
HV-5803, Containment Sump Radwaste Isolation Valve.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Plausible as 2 of 3 indications are correct, however, HV-9304 is normally closed and opens on a RAS signal.
B. Correct.
C. Incorrect. Plausible as 2 of 3 indications are correct, however, HV-4714 closes on a MSIS signal.
D. Incorrect. Plausible as 2 of 3 indications are correct, however, HV-9336 does not receive a signal from any ESFAS related isolation.

Technical Reference(s) SO23-3-2.22, pages 71 and 72 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2XAL08- (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 9

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	001 A1.11	
	Importance Rating	3.7	

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CRDS controls including: Required primary system subcooling during shutdown; location of indication

Proposed Question: Common 29

Given the following conditions:

- Unit 2 is shutting down from 100% power.
- CEAs are being inserted for Axial Shape Index control.
- Annunciator 56B45 - RCS SUBCOOLED MARGIN LO has just alarmed.
- The Subcooled Margin Monitor (SCM) Display on CR-56 is not available.

Which ONE (1) of the following can be used to determine if adequate subcooled margin exists and where is it determined?

A. Select HEAD and observe SCM on the QSPDS Display to ensure subcooled margin greater than 20ºF.

B. Select RCS and observe SCM on the QSPDS Display to ensure minimum NPSH for the RCPs.

C. Select WORST CASE and observe SCM on the CFMS Display to ensure subcooled margin greater than 20ºF.

D. Select CET and observe SCM on the DLMS Display to ensure minimum NPSH is being met for the RCPs.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Plausible because SMM can be read on the QSPDS Display and SMM was previously used to determine if operation could continue, however, new standard is adequate NPSH for the RCPs.

B. Correct.

C. Incorrect. Plausible because SMM can be read on the CFMS Display and SMM was previously used to determine if operation could continue, however, new standard is adequate NPSH for the RCPs.

D. Incorrect. Plausible because NPSH is the required standard, however, the DLMS cannot be use to determine subcooled margin.

Technical Reference(s) SD-SO23-820 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 7, 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	015 K6.04	
	Importance Rating	3.1	

Knowledge of the effect of a loss or malfunction on the following will have on the NIS: Bistables and logic circuits

Proposed Question: Common 30

The plant is operating at 100% power when the upper detector of Safety Channel "B" Excore Nuclear Instrument fails high.

Which ONE (1) of the following PPS trip functions/bistables is **NOT** affected by this failure?

A. High Logarithmic Power

B. High Linear Power

C. High Local Power Density

D. Low Departure from Nucleate Boiling Ratio

Proposed Answer: A

Explanation (Optional):

A. Correct. This PPS trip is generated by the Log NI Safety Channel.
B. Incorrect. A safety channel failure will trip this bistable.
C. Incorrect. A safety channel failure will trip this bistable.
D. Incorrect. A safety channel failure will trip this bistable.

Technical Reference(s) SO23-13-18, Attachment 5 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2XCR08- (As available)

Question Source: Bank # N5708
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 7
_____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	017 K3.01	
	Importance Rating	3.5	

Knowledge of the effect that a loss or malfunction of the ITM system will have on the following: Natural circulation indications

Proposed Question: Common 31

Given the following conditions:

- Representative (REP) Core Exit Thermocouple (CET) value is 560ºF.
- A CET that was previously indicating 560ºF has failed to 0ºF.

Which ONE (1) of the following identifies the impact that the CET failure to 0ºF has on the REP CET value used for verification of Natural Circulation?

The REP CET calculated value…

A. does not change, the CET input is NOT used by QSPDS.

B. indicates lower, the CET input is used by QSPDS.

C. does not change, the CET input is used by QSPDS.

D. indicates lower, the CET input is flagged as invalid.

Proposed Answer: A

Explanation (Optional):

A. Correct. The input is flagged as invalid and discarded.
B. Incorrect. Plausible because if the value is used it would lower the REP CET value.
C. Incorrect. Plausible because the CETs are checked within statistical bands about the mean CET temperature.
D. Incorrect. Plausible as it is partially correct. The input is flagged as invalid, however, it is not used by QSPDS.

Technical Reference(s) From SD-SO23-820, page 87 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2XCR01- (As available)

Question Source: Bank # N75652
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 7
_____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	027 K2.01	
	Importance Rating	3.1	

Knowledge of bus power supplies to the following: Fans

Proposed Question: Common 32

Which ONE (1) of the following is the power supply to the Containment Recirculation Filtration Unit (A-353)?

480 Volt Motor Control Center…

A. B04

B. B09

C. BF

D. BN

Proposed Answer: B

Explanation (Optional):

A. Correct. Located in the 50' Control Building.
B. Incorrect. This is a 63' Penetration Building MCC.
C. Incorrect. This is a 30' AFW Building MCC.
D. Incorrect. This is a 63' Penetration Building MCC.

Technical Reference(s) SD-SO23-770, page 75 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # N127296
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 9

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	029 A1.02	
	Importance Rating	3.4	

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the Containment Purge System controls including: Radiation levels

Proposed Question: Common 33

Given the following conditions:

- A Containment Purge is in progress.
- RE-7865, Plant Vent Stack Radiation Monitor is aligned to the Purge Stack.
- Radiography in the vicinity of RE-7807, Containment Airborne Radiation Monitor has placed it in alarm.

Which ONE (1) of the following identifies the result of RE-7807 going into alarm?

A. Initiates a Containment Purge Isolation Signal.

B. Closes the outside Containment Purge Isolation Valves.

C. Secures Continuous Exhaust Fans A-310, A-311 and A-312.

D. Closes the inside Containment Purge Isolation Valves.

Proposed Answer: A

Explanation (Optional):

A. Correct. RE-7807 will initiate a CPIS.

B. Incorrect. Plausible because high radiation on RE-7865 will initiate these closures in its current alignment.

C. Incorrect. Plausible because this action is associated with radioactive release, however, the valve is FV-7202, Waste Gas Release Valve which cannot open if these fans are secured.

D. Incorrect. Plausible because high radiation on RE-7865 will initiate these closures in its current alignment, however, only the outside Containment Valves are affected.

Technical Reference(s) SD-SO23-770, pages 8 & 44 (Attach if not previously provided)
SD-SO23-770, Figure 1

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2XAL09- (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 9

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	035 K5.03	
	Importance Rating	2.8	

Knowledge of operational implications of the following concepts as the apply to the S/GS: Shrink and swell concept

Proposed Question: Common 34

Which ONE (1) of the following responses is expected immediately following the opening of a Steam Bypass Control Valve at 50% power?

Steam Generator Narrow Range level…

A. swells due to an increase in SG downcomer mass.

B. shrinks due to lowering SG pressure.

C. swells due to a decrease in specific volume of the SG liquid.

D. shrinks due to collapse of bubbles in the tube bundle region.

Proposed Answer: A

Explanation (Optional):

A. Correct. SG level swells due to formation of bubbles in the tube bundle area and an increase in SG downcomer mass.

B. Incorrect. Plausible because SG pressure will lower, however, this causes bubbles in the TBA and resultant swell.

C. Incorrect. Plausible because SG level will swell, however, it is caused by an increase in specific volume of the SG liquid.

D. Incorrect. Plausible because there is a change in bubble formation in the tube bundle area, however, they increase due to lower SG pressure.

Technical Reference(s) SD-SO23-250, page 86 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: Steam Tables

Learning Objective: 2XIR06- (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	045 K1.20	
	Importance Rating	3.4	

Knowledge of the physical connections and/or cause-effect relationships between the MT/G system and the following systems: Protection system

Proposed Question: Common 35

Given the following Unit 2 conditions:

- Moisture Separator Reheater (MSR) Drain Tank Level control set point has been 14" for 5 minutes.
- Turbine Speed is at 1910 rpm.
- LP Exhaust Hood Temperature is 230°F.
- Turbine Lube Oil Pressure at the Lube Oil Cooler Outlet has been 21 psig for 3 minutes.

Which ONE (1) of the following will cause a trip of the Main Turbine?

A. MSR Drain Tank Level

B. Turbine Speed

C. Low Pressure Exhaust Hood Temperature

D. Turbine Lube Oil Pressure

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Plausible because a trip exists for level 10” above normal level which is measured from centerline, 26” above base.

B. Incorrect. Plausible because a trip exists for overspeed but it is at 1926 rpm.

C. Incorrect. Plausible because a trip exists for high temperature of 280ºF, a pre-trip alarm is received at 230ºF.

D. Correct. The Bearing Oil Pressure Trip occurs at 12 psig at the most remote bearing, which corresponds to a pressure of 26.5 psig at the Lube Oil Cooler Outlet.

Technical Reference(s) SD-SO23-180, page 66 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2XTR02- (As available)

Question Source: Bank # N41898
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 7

Comments:

Examination Outline Cross-reference:

Level	RO	SRO
Tier #	2	
Group #	2	
K/A #	068 A2.02	
Importance Rating	2.7	

Ability to (a) predict the impacts of the following malfunctions or operations on the Liquid Radwaste System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Lack of tank recirculation prior to release

Proposed Question: Common 36

Given the following conditions:

- A liquid release of T-057, Radwaste Primary Tank has been in progress for 5 minutes using release valve 2/3HV-7641, Radwaste Discharge Radiation Monitor.
- The release was automatically terminated due to high radiation as sensed by 2/3 RE-7813, Radwaste Discharge Line Radiation Monitor.
- Review of the Release Permit has identified an insufficient recirculation of T-057, Radwaste Primary Tank prior to release.

Which ONE (1) of the following identifies

a.) The impact of the termination due to high radiation?

b.) What action should be taken to correct the situation?

A. a. Offsite Dose Calculation Manual (ODCM) limits may have been exceeded.
   b. Complete the release attachment and initiate a new attachment to finish releasing the tank per SO23-8-4, Miscellaneous Wastes System Operation.

B. a. National Pollution Discharge Elimination Standards (NPDES) may have been violated.
   b. Complete the release attachment, sample and finish releasing the tank per SO23-8-7, Liquid Radioactive Waste Release Operations.

C. a. Offsite Dose Calculation Manual (ODCM) limits may have been exceeded.
   b. Complete the release attachment and initiate a new attachment to finish releasing the tank per SO23-8-7, Liquid Radioactive Waste Release Operations.

D. a. National Pollution Discharge Elimination Standards (NPDES) may have been violated.
   b. Complete the release attachment, sample and finish releasing the tank per SO23-8-4, Miscellaneous Wastes System Operation.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Plausible as all conditions are correct with the exception of the procedure which can be used to process waste to T-075, however, SO23-8-4 directs the use of SO23-8-7 if release is desired.

B. Incorrect. Plausible because NPDES requirements must be met, however their main concern has to do with oil, grease and total suspended solids as opposed to radiation.

C. Correct. Per the L&S, if a high radiation secures the release then perform actions as noted.

D. Incorrect. Plausible because NPDES requirements must be met, however, the incorrect procedure is being used to complete the release.

Technical Reference(s) SO23-8-7, L&S 1.15, 2.5, 2.6 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2XRR07- (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 11, 13

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	072 A3.01	
	Importance Rating	2.9	

Ability to monitor automatic operation of the ARM system, including: Changes in ventilation alignment

Proposed Question: Common 37

Which ONE (1) of the following identifies the change in the Control Room ventilation alignment when a high radiation signal is received on 2/3RE-7824G1 & 2/3RE-7825G2, Control Room Intake Air Train A and B Radiation Monitors?

A. 2/3 A-206 and 2/3 A-207, Emergency Ventilation Supply Fans are started.
94% of the Control Room Complex air is recycled.
2/3 E-335 and 2/3 E-336, Emergency Chiller Units are started.

B. 2/3 A-206 and 2/3 A-207, Emergency Ventilation Supply Fans are secured.
100% of the Control Room Complex air is recycled.
2/3 E-335 and 2/3 E-336, Emergency Chiller Units are started

C. 2/3 A-206 and 2/3 A-207, Emergency Ventilation Supply Fans are secured.
94% of the Control Room Complex air is recycled.
2/3 A-201 and 2/3 A-202, Control Room Complex Exhaust Fans are secured

D. 2/3 A-206 and 2/3 A-207, Emergency Ventilation Supply Fans are started.
100% of the Control Room Complex air is recycled.
2/3 A-201 and 2/3 A-202, Control Room Complex Exhaust Fans are secured.

Proposed Answer: A

Explanation (Optional):

A. Correct.
B. Incorrect. Plausible because these actions are correct for a TGIS, but not a CRIS.
C. Incorrect. Plausible because these actions are partially correct for a TGIS and a CRIS.
D. Incorrect. Plausible because emergency fans are started and CR Complex Exhaust Fans are secured, however, recycled air setpoint is 94%.

Technical Reference(s) SD-SO23-624, pages 82 & 86 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2XVL05N- (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 7, 8

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	079 A4.01	
	Importance Rating	2.7	

Ability to manually operate and/or monitor in the control room: Cross-tie valves with IAS

Proposed Question: Common 38

Instrument air pressure has been steadily decreasing from 105 psig as read on CR-61 2/3 PI-5344A. Pressure continues to decrease until it stabilizes at ~86 psig.

Which ONE (1) of the following actions occurred that caused pressure to stabilize?The LAG 1 Instrument Air Compressor started and is fully loaded.

B. PCV-5354, Respiratory and Service Air cross connect valve has opened.

C. PCV-5458, Nitrogen Backup to Instrument Air supply valve has opened.

D. The LEAD 1 Instrument Air Compressor started and is fully loaded.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Plausible because this compressor is available and will automatically start at 98 psig, however, the setpoint for full loading is ~94 psig.
B. Correct. This valve opens at 88 psig and will attempt to maintain pressure >84 psig.
C. Incorrect. Plausible because this valve is available and will automatically open, however, the setpoint for PCV-5458 is 83 psig.
D. Incorrect. Plausible because this compressor is available and will automatically start at 106 psig, however, the setpoint for full loading is ~102 psig.

Technical Reference(s) SO23-13-5, page 9 (Attach if not previously provided)
SO23-1-1, Attachment 22

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2AO705- (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	007 G2.4.50	
	Importance Rating	3.3	

Emergency Procedures / Plan Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.

Proposed Question: Common 39

Given the following conditions:

- Unit 2 is performing the SO23-12-2, Reactor Trip Recovery following a loss of offsite power.
- Annunciator 63A43 - 2D2 BATTERY BKR OPEN alarms in the Control Room.
- The PEO has verified that 2D2 Battery Breaker is open.
- DC Bus 2D2 indicates 129 VDC.

Which ONE (1) of the following remedies is required?

A. Attempt to re-close the battery breaker or remove the Y-002 Inverter from service.

B. Perform one re-close attempt of the battery breaker, and then leave the Y-002 Inverter in service.

C. Verify proper operation of Y-002 in its current configuration.

D. Check 2D2 for a battery ground and remove Y-002 from service if the ground LED light is extinguished.

Proposed Answer: A

Explanation (Optional):

A. Correct. To prevent Inverter damage, a battery charger and inverter should not be in service with the battery breaker open. The battery charger is unable to regulate and filter DC to the inverter without the capacitance effect of the battery per 63A43.

B. Incorrect. Plausible because one re-close attempt is the standard practice at SONGS.

C. Incorrect. Plausible, however, a battery charger and inverter should not be in service with the battery breaker open.

D. Incorrect. Plausible because this action is required, however, a ground condition is confirmed when the ground LED light is solidly illuminated per 63A33.

Technical Reference(s) SO23-15-63.A43, Caution at Step 3.1 (Attach if not previously provided)
SO23-15-63.A33, Footnote

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # N127271
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	008 AA2.26	
	Importance Rating	3.1	

Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space Accident: Probable PZR steam space leakage paths other than PORV or code safety

Proposed Question: Common 40

Given the following conditions:

- Pressurizer pressure is slowly lowering.
- Pressurizer level is slowly lowering.
- Containment humidity is slowly rising.
- Pressurizer vapor space and water temperatures remain unchanged.
- Subcooled Margin is slowly lowering.

Which ONE (1) of the following is the reason for the conditions listed?

A Pressurizer…

A. safety valve has minor seat leakage

B. pressure sensing line is leaking.

C. level condensing pot is leaking.

D. heater weld is leaking.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Plausible because all the conditions lead to this problem except Containment humidity is rising, this would not be a symptom.

B. Incorrect. Plausible because all the conditions lead to this problem, however, the vapor space temperature would not be unchanged.

C. Incorrect. Plausible because PZR level is lowering, however, a leak from the condensing pot would cause level to rise due to reference leg flashing.

D. Correct. Given the conditions, this is the source of the leak.

Technical Reference(s) SD-SO23-360, Figure III-1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2XAR02- (As available)

Question Source: Bank # ____
Modified Bank # ____ (Note changes or attach parent)
New X

Question History: Last NRC Exam ____

Question Cognitive Level: Memory or Fundamental Knowledge ____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 3, 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	009 EK3.07	
	Importance Rating	3.3	

Knowledge of the reasons for the following responses as the apply to the small break LOCA: Increasing indication on CCWS process monitor: indicates in-leakage of radioactive liquids

Proposed Question: Common 41

Given the following conditions:

- A small break LOCA is in progress on Unit 3.
- Both Trains of CCW are in service.
- RE-7819, CCW Process Radiation Monitor is in alarm

Due to equipment malfunctions the following alignment occurs:

- The CCW Critical Loop and Letdown Heat Exchanger are aligned to Train A.
- The CCW Non-Critical Loop is aligned to Train B.

Which ONE (1) of the following is the location of the leak and what action will mitigate the CCW in-leakage?

A. Letdown Heat Exchanger; Isolate Letdown flow.

B. RCP Seal Cooler; Close CCW Non-Critical Loop Supply Valves.

C. Letdown Heat Exchanger; Isolate Component Cooling Water flow.

D. RCP Seal Cooler; CCW temperature sensing valves automatically isolate.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Plausible because the LD HX is cooled by CCW, however, in the current alignment a LD to CCW leak would not be detected because RE-7819 is supplied from a flow venturi on the NCL.

B. Incorrect. Plausible because this is the source of the leak, however, the leak will continue because of the position of check valves in the RCP seal cooler supply line.

C. Incorrect. Plausible because the LD HX is cooled by CCW, however, in the current alignment a LD to CCW leak would not be detected.

D. Correct. Given the current CCW Train alignment this is the source.

Technical Reference(s) SD-SO23-400, Figures 2A & 4 (Attach if not previously provided)
SD-SO23-400, page 25

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2XRR08- (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 4, 7, 11

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	011 EK2.02	
	Importance Rating	2.6	

Knowledge of the interrelations between the and the following Large Break LOCA: Pumps

Proposed Question: Common 42

Given the following Unit 2 conditions:

- An SIAS actuated due to a LOCA.
- Both HPSI Pumps are tripped.
- RCS pressure is 450 psig.
- RCS Subcooling is 20°F.
- Containment pressure is 2.5 psig.
- All other equipment is running per design.
- The crew is performing actions of SO23-12-1, Standard Post Trip Actions.

Which ONE (1) of the following describes the required action and reason for the action with respect to the RCPs?

A. Stop two RCPs and leave two RCPs running to provide forced cooling flow of the RCS.

B. Stop two RCPs and leave two RCPs running to minimize fluid mass loss out of the break.

C. Stop all RCPs to prevent phase separation of RCS liquid.

D. Stop all RCPs due to loss of subcooling.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Plausible because HPSI Pumps are secured, however, RCS subcooling is lost.

B. Incorrect. Plausible because the Trip 2/Leave 2 criteria when <1430 psia is based on minimizing inventory loss, however, this condition applies to SBLOCAs not a LBLOCA.

C. Incorrect. Plausible because phase separation may occur in SBLOCAs after RCPs are tripped, leading to core uncovery.

D. Correct. RCPs are tripped due to a loss of subcooling.

Technical Reference(s) SO23-14-1, Step 10 (Attach if not previously provided)
RCP Trip Strategy

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2EO701- (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 10
_____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	015 AK3.03	
	Importance Rating	3.7	

Knowledge of the reasons for the following responses as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow) : Sequence of events for manually tripping reactor and RCP as a result of an RCP malfunction

Proposed Question: Common 43

Given the following conditions for Reactor Coolant Pump (RCP) P-004:

- There is no indicated Controlled Bleed-Off flow.
- Lower Seal pressure is 2235 psia.
- Middle and Upper Seal pressures are oscillating between 75 and 2235 psia.
- Vapor Seal Cavity pressure is 75 psia.

Which ONE (1) of the following is the required action and reason for the given set of conditions?

A. Immediately trip the Reactor. When CEAs have been inserted for 5 seconds, trip RCP P-004 to prevent exceeding DNBR.

B. Initiate a plant shutdown. Trip the Reactor and RCP P-004 to preserve the Vapor Seal and prevent a small break LOCA.

C. Immediately trip the Reactor and after 5 seconds trip RCP P-004 to prevent exceeding local power density (LPD) setpoints.

D. Initiate a plant shutdown. When the Reactor is tripped and CEAs have been inserted for 5 seconds, trip RCP P-004 to prevent exceeding local power density (LPD) setpoints.

Proposed Answer: A

Explanation (Optional):

A. Correct. This is the required action and reason for the given conditions.

B. Incorrect. Plausible because a trip is required, however, procedure requires waiting 5 seconds after the CEAs are inserted and trip should occur immediately.

C. Incorrect. Plausible because if not for the reason, this action would be correct.

D. Incorrect. Plausible because if not for the CBO flow problem and reason, this action would be correct.

Technical Reference(s) SO23-13-6, Step 2 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2AO706- (As available)

Question Source: Bank # ____
Modified Bank # ____ (Note changes or attach parent)
New X

Question History: Last NRC Exam ____

Question Cognitive Level: Memory or Fundamental Knowledge ____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 3, 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	022 AK1.03	
	Importance Rating	3.0	

Knowledge of the operational implications of the following concepts as they apply to Loss of Reactor Coolant Pump Makeup: Relationship between Charging flow and PZR level

Proposed Question: Common 44

Given the following conditions:

- Unit 2 is at 100% power.
- Pressurizer Level Setpoint is 53%.
- Pressurizer Level is 50%.
- Annunciator 58A42, CHARGING PUMP P191 TRAIN A OC is in alarm.

Which ONE (1) of the following identifies the condition of Charging and Letdown?

A. Letdown flow at minimum.
Charging flow at 44 gpm.

B. Letdown flow normal.
Charging flow at 44 gpm.

C. Letdown flow at minimum.
Charging flow at 88 gpm.

D. Letdown flow normal.
Charging flow at 88 gpm.

Proposed Answer: A

Explanation (Optional):

A. Correct. With a 3% difference between setpoint and level following a Charging Pump trip, one Charging Pump will be running and Letdown flow is at minimum.

B. Incorrect. Plausible because of correct Charging flow, however, when Δ level reaches -1.1%, Letdown flow is at minimum.

C. Incorrect. Plausible because of correct Letdown flow, however, Δ level must reach -3.9% to start the 2nd Charging Pump.

D. Incorrect. When Δ level reaches -1.1%, Letdown flow is minimum; at -3.9% the 2nd Charging Pump starts.

Technical Reference(s) SD-SO23-360, Figure III-16 (Attach if not previously provided)
SD-SO23-390, Figure I-17

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	025 AA1.01	
	Importance Rating	3.6	

Ability to operate and / or monitor the following as they apply to the Loss of Residual Heat Removal System: RCS/RHRS Cooldown Rate

Proposed Question: Common 45

Given the following conditions:

- Unit 2 was cooling down to MODE 5 with Train A Shutdown Cooling in service.
- RCS cooldown rate was 20ºF per hour when a Loss of Train A Shutdown Cooling occurred.
- The Train B SDC Pump was started and current SDC flow is 2000 gpm.
- The current cooldown rate is 50ºF per hour with an RCS temperature of 300ºF.

Which ONE (1) of the following describes the actions necessary to restore SDC and continue with the RCS cooldown per SO23-13-15, Loss of Shutdown Cooling?

A. Throttle closed the SDC HX Bypass Flow Control Valve to establish a minimum flowrate of 2750 gpm.
Throttle closed the SDC Heat Exchanger outlet valve to establish the required cooldown rate.

B. Throttle open the SDC HX Bypass Flow Control Valve to establish a minimum flowrate of 2500 gpm.
Throttle closed the SDC Heat Exchanger outlet valve to establish the required cooldown rate.

C. Throttle closed the SDC HX Bypass Flow Control Valve to establish a minimum flowrate of 2750 gpm.
Throttle open the SDC Heat Exchanger outlet valve to establish the required cooldown rate.

D. Throttle open the SDC HX Bypass Flow Control Valve to establish a minimum flowrate of 2500 gpm.
Throttle open the SDC Heat Exchanger outlet valve to establish the required cooldown rate.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Partially correct as throttling closed the HX outlet valve will control the cooldown rate, however, the bypass valve would be opened.

B. Correct. The bypass valve must be throttled open to establish minimum flow and the HX closed to control the cooldown rate.

C. Incorrect. Partially correct for minimum flowrate, however, the bypass valve would be opened and the HX outlet valve closed.

D. Incorrect. Partially correct as throttling open the bypass valve will control the cooldown rate, however, the bypass valve would be opened

Technical Reference(s) SO23-13-15, Steps 5 & 6 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2AO715- (As available)

Question Source: Bank # ____
Modified Bank # ____ (Note changes or attach parent)
New X

Question History: Last NRC Exam ____

Question Cognitive Level: Memory or Fundamental Knowledge ____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 5, 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	026 G2.1.2	
	Importance Rating	3.0	

Conduct of Operations: Knowledge of operator responsibilities during all modes of plant operation

Proposed Question: Common 46

Given the following plant conditions:

- Unit 2 operating at 100% power.
- CCW Pump 2P-025 in service and aligned to Train B for single train operation.
- A Sustained Degraded Voltage Signal has opened the supply breakers from the Reserve Auxiliary Transformers to Buses 2A04 and 2A06.

What ONE (1) of the following operator actions is required to restore CCW to the Non- Critical Loop?

Perform a manual start of CCW Pump…

A. 2P-024 and ensure SWC Pump 2P-307 starts.

B. 2P-025 and then transfer the Non-Critical Loop.

C. 2P-025 and ensure SWC Pump 2P-114 starts.

D. 2P-026 and then transfer the Non-Critical Loop.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Plausible because this action will restore CCW, however, it will not provide flow to the RCPs unless the NCL is transferred.

B. Incorrect. Plausible because Train B was in service, however, the NCL does not need to be transferred in this condition.

C. Correct. Since P-025 was in service this would be the expected action to restore CCW flow.

A. Incorrect. Plausible because Train B was in service, however, the NCL does not need to be transferred in this condition.

Technical Reference(s) SO23-13-7, Step 2 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2AO707- (As available)

Question Source: Bank # N127253
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 7, 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	027 AA1.04	
	Importance Rating	3.9	

Ability to operate and / or monitor the following as they apply to the Pressurizer Pressure Control Malfunctions: Pressure recovery, using emergency-only heaters

Proposed Question: Common 47

Given the following conditions:

- Pressurizer Pressure Channel Y is in service.
- Pressurizer Pressure indication PT-0100Y has failed high.
- HS-0100A, Pressurizer Pressure Channel Selector is in the Channel Y position.
- An inadvertent SIAS has occurred.
- Pressurizer Pressure is 2150 psia and slowly lowering.

Which ONE (1) of the following is required to restore operation of the 1E Pressurizer heaters?

A. Transfer PZR Pressure Control to Channel X.
Restore 1E PZR Heaters by going to OVERRIDE then OFF then AUTO.

B. Reset the SIAS signal.
Restore 1E PZR Heaters by going to OFF then AUTO.

C. Transfer PZR Pressure Control to Channel X.
Restore 1E PZR Heaters by going to OFF then AUTO.

D. Reset the SIAS signal.
Restore 1E PZR Heaters by going to OVERRIDE then OFF then AUTO.

Proposed Answer: A

Explanation (Optional):

A. Correct. This is the desired action to restore the 1E PZR heaters in their current configuration.

B. Incorrect. Plausible because resetting the SIAS would remove the SIAS trip signal, however, leaving Channel Y in service continues to send a trip signal to the heaters.

C. Incorrect. Plausible because this is the desired action to restore the Non-1E PZR heaters, however, with SIAS present heaters must be overridden.

A. Incorrect. Plausible because had the Non-1E heaters not tripped this would place them in operation. Plausible because resetting the SIAS would remove the SIAS trip signal, however, leaving Channel Y in service continues to send a trip signal to the heaters.

Technical Reference(s) SD-SO23-360, page 98 (Attach if not previously provided)
SO23-13-27, Attachment 1

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2AO727- (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	038 G2.4.6	
	Importance Rating	3.1	

Emergency Procedures / Plan Knowledge symptom based EOP mitigation strategies.

Proposed Question: Common 48

Given the following conditions:

- A small break LOCA is occurring.
- PZR pressure is 1750 psia and slowly lowering.
- Thot is 512ºF.
- Tcold is 510ºF.
- Core exit thermocouple temperature is 515ºF.
- Reactor Coolant Pumps P-001 and P-004 have been manually tripped.

Which ONE (1) of the following describes the reason that two (2) RCPs were left operating under these conditions?

A. Maintaining forced circulation is desirable and the plant can remain in a safe condition.

B. Maintaining forced circulation is desirable and the potential for RCP seal failures is reduced.

C. Maintaining 2 pumps running minimizes RCP journal bearing wear and damage.

D. Maintaining 2 pumps running minimizes the potential for the formation of boron crystals in the core.

Proposed Answer: A

Explanation (Optional):

A. Correct.

B. Incorrect. Plausible because the older seal package was susceptible to failure.

C. Incorrect. Plausible because industry experience has shown RCP damage with 2 pumps operating, however, the pumps would be in the same loop.

D. Incorrect. Plausible because of post-LOCA concerns for boron precipitation, however, there is less boil off with a SBLOCA.

Technical Reference(s) SO23-14-1, Step 10e Bases (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # N126739
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	040 G2.1.32	
	Importance Rating	3.4	

Conduct of Operations: Ability to explain and apply all system limits and precautions.

Proposed Question: Common 49

Given the following conditions:

- Steam Generator (SG) E-089 Excess Steam Demand Event (ESDE) has occurred inside Containment.
- SG E-089 wide range level is 0% (dryout).
- SG E-088 narrow range level is 34%.
- EFAS-2 was actuated post-trip while EFAS-1 was not.
- The crew is preparing to reset ESFAS Functions per SO23-12-5, ESDE.

Which ONE (1) of the following is the caution for resetting a Main Steam Isolation Signal and reason for that caution?

A. MSIS can be reset. Limit the flowrate to SG E-088 to avoid collapsing the feed ring.

B. MSIS should **not** be reset. AFW flow may initiate to SG E-089 and result in a Steam Generator tube rupture.

C. MSIS can be reset. Limit the flowrate to SG E-088 to avoid Pressurized Thermal Shock concerns.

D. MSIS should **not** be reset. AFW flow may initiate to SG E-089 and collapse the feed ring.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Plausible because MSIS could be reset if both EFAS 1 & 2 had actuated, however, both SGs are not >21%. The reason is correct because SG level is <40%, the point at which feed ring collapse is a concern.

B. Correct. Because EFAS-1 was not actuated AFW flow could initiate and result in a SGTR.

C. Incorrect. Plausible because PTS is a concern, however, it should have been addressed by this point in the procedure.

D. Incorrect. Plausible because the MSIS status is correct, however, the reason is not.

Technical Reference(s) SO23-14-5, page 10 (Attach if not previously provided)
SO23-12-5, page 12

Proposed references to be provided to applicants during examination: NONE

Learning Objective: EO705- (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	056 AK3.02	
	Importance Rating	4.4	

Knowledge of the reasons for the following responses as they apply to the Loss of Offsite Power: Actions contained in EOP for loss of offsite power

Proposed Question: Common 50

Unit 2 has entered SO23-12-8, Station Blackout.

Which ONE (1) of the following is the reason for ensuring TS-2 DC 127F1 through 127F4 knife switches at Diesel Generator bus potential transformer cubicle are opened prior to reenergizing a 1E 4 kV Bus?

A. Reset the SIAS signal.

B. Reset the LOVS signal.

C. Reset the undervoltage flags.

D. Reset the DGVSS signal.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Plausible as reset may be required, however, it is done using SO23-3-2.22, ESFAS Operation.

B. Correct. The Loss of Voltage Signal (LOVS) must be reset.

C. Incorrect. Plausible because resetting of the relays will allow resetting of the UV flags but not vice versa.

D. Incorrect. Plausible because the 127F1-4 relays have a contact for addressing a degraded grid voltage with SIAS, however, in this context it is the LOVS signal that must be reset.

Technical Reference(s) SO23-12-8, page 8 (Attach if not previously provided)
SO23-14-11, Attachment 8

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2EO709- (As available)

Question Source: Bank # N5600
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 7, 10
_____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	057 AA2.03	
	Importance Rating	3.7	

Ability to determine and interpret the following as they apply to the Loss of Vital AC Instrument Bus: RPS panel alarm annunciators and trip indicators

Proposed Question: Common 51

Given the following conditions:

- Unit 3 is at 100% power
- Annunciators are in alarm:
  - 56A02, LOG POWER LEVEL HI CHANNEL TRIP
  - 56A03, LOCAL POWER DENSITY HI CHANNEL TRIP
  - 56A04, DNBR LO CHANNEL TRIP
- Pressurizer pressure is 2235 psia and steady.
- Pressurizer level is 53% and steady.
- Reactor Trip Path 3 and 4 lights are **extinguished**.
- Plant Protection System bistables on Channels A and C ROMs are **not tripped**.

Which ONE (1) of the following Vital AC Buses has been lost?

A. Vital Bus 1.

B. Vital Bus 2.

C. Vital Bus 3.

D. Vital Bus 4.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Plausible because Reactor Trip Paths 1 & 2 are actuated, however, in this condition the lights are extinguished, not illuminated. Also, neither channel of PZR level and pressure were affected.

B. Incorrect. Plausible because the Channel A & C ROMs are not tripped, however, a loss of VB #2 removes all trip path indication from the Control Room. Also, neither channel of PZR level and pressure were affected.

C. Incorrect. Plausible because PZR level and pressure were not affected and trip paths 1 & 2 are lit, however, in this condition, PPS B & D ROMs are not tripped.

D. Correct. Given the trip path and PPS ROM indications, VB #4 was lost.

Technical Reference(s) SO23-13-18, Attachment 4 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2AO718- (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	058 G2.4.6	
	Importance Rating	3.1	

Emergency Procedures / Plan Knowledge symptom based EOP mitigation strategies.

Proposed Question: Common 52

Given the following conditions:

- Unit 2 has just tripped and the following alarms have been received:
  - 63A32 - 2D1 125 VDC BUS TROUBLE
  - 63A52 - 2D1 CHARGER TROUBLE
- It was determined that the 2D1 Battery Charger has malfunctioned.

Which ONE (1) of the following actions is required to restore power to the DC bus?

A. Open the 2D1 Battery Breaker and cross-tie DC Bus 2 with DC Bus 1.

B. Minimize DC loads and cross-tie DC Bus 2 with DC Bus 4.

C. Minimize DC loads and place the Swing Battery Charger in service.

D. Open the 2D1 Battery Breaker and place the Swing Battery Charger in service.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Plausible as this action would be allowed during a Station Blackout or in MODES 5 or 6, however, DC Bus 2 must be cross connected with DC Bus 4.

B. Incorrect. Plausible as this action would be allowed during a Station Blackout or in MODES 5 or 6.

C. Correct.

D. Incorrect. Plausible because this action is possible, however, the battery must remain in service in order for the affected vital inverter to operate properly.

Technical Reference(s) SO23-15-63.A, 63A52 (Attach if not previously provided)
SD-SO23-140, page 21

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 8, 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	062 AK3.03	
	Importance Rating	4.0	

Knowledge of the reasons for the following responses as they apply to the Loss of Nuclear Service Water Guidance actions contained in EOP for Loss of nuclear service water

Proposed Question: Common 53

SO23-13-7, Loss of CCW/SWC contains guidance to maintain the affected trains CCW Pump running during the SWC Pump transfer while recovering from the loss of a single Salt Water Cooling (SWC) Pump.

Which ONE (1) of the following is the reason for maintaining the CCW loop pressurized?

A. Ensures the CCW radiation monitor is in service in the event of CCW leakage into SWC.

B. Prevent thermal shock of the CCW Heat Exchanger.

C. CCW system provides cooling for the CCW Pump seal.

D. Prevent saltwater from entering the CCW System in the event of a tube leak.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Plausible when referring to the Letdown HX and the Non-Critical Loop.
B. Incorrect. Plausible because thermal shock is a concern.
C. Incorrect. Plausible since cooling/sealing water is provided to the CCW Pump from CCW.
D. Correct. This is the guidance contained in SO23-13-7.

Technical Reference(s) SO23-13-7, Step 14 RNO (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # N56529
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 10
_____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	029 EK1.03	
	Importance Rating	3.6	

Knowledge of the operational implications of the following concepts as they apply to the ATWS: Boron effects on reactivity

Proposed Question: Common 54

Given the following conditions:

- Power level is 25%.
- An ATWS is in progress.
- All attempts to trip the Reactor have failed.
- Emergency Boration is being initiated.
- The BAMU Pumps will NOT start.

Which ONE (1) of the following sources of boron will have the greatest impact on core reactivity and why?

A. BAMU Tanks because of the higher flowrate.

B. BAMU Tanks because of the higher boron concentration.

C. RWST because of the higher head of the RWST Tank.

D. RWST because of the closer connection to the Charging Pump suction.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Plausible because BAMU Tanks are closer to the Charging Pumps, however, flow is limited by the positive displacement Charging Pumps.

B. Correct.

C. Incorrect. Plausible because the top of the tank is at a higher level than the BAMU Tanks, however, flow is limited by the positive displacement Charging Pumps.

D. Incorrect. Plausible because RWST connection is at the Charging Pump suction but the BAMU is also (physically different connection).

Technical Reference(s) Tech Spec, 3.1.9 Bases (Attach if not previously provided)
LCS Figure 3.1.104-1

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	E05 EK2.2	
	Importance Rating	3.7	

Knowledge of the interrelations between the (Excess Steam Demand) and the following: Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.

Proposed Question: Common 55

SO23-12-5, Excess Steam Demand Event, directs stabilizing Reactor Coolant temperatures using the Atmospheric Dump Valve on the intact Steam Generator prior to dry out occurring on the affected Steam Generator.

Which ONE (1) of the following is the reason for stabilizing Reactor Coolant System temperature?

A. Limit RCS heatup which may result in rapid re-pressurization and onset of PTS conditions.

B. Ensure that the minimum amount of RCS subcooling margin is maintained.

C. Ensure consistent RCS loop temperatures to prevent loss of EFAS/AFW flow due to high SG ΔP.

D. Prevent the post-accident RCS cooldown rate from exceeding the limits in Technical Specifications

Proposed Answer: A

Explanation (Optional):

A. Correct. Failure to maintain temperature could cause a system repressurization and PTS.
B. Incorrect. Plausible because too much subcooling could create a PTS concern dependent on the plant conditions and the PT Curve.
C. Incorrect. Plausible because this condition could occur but not for the condition given.
D. Incorrect. Plausible because this condition could occur but since the CD rate cannot be controlled it is the heatup and repressurization that is.

Technical Reference(s) SO23-14-5, page 10 (Attach if not previously provided)
SO23-12-5, page 12

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2EO705- (As available)

Question Source: Bank # N10919
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 10
_____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	E06 EA1.1	
	Importance Rating	4.0	

Ability to operate and / or monitor the following as they apply to the (Loss of Feedwater) Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Proposed Question: Common 56

Given the following conditions:

- Unit is recovering from a loss of feedwater following a seismic event and loss of offsite power.
- Plant temperature is stable at 545ºF.
- Auxiliary Feedwater Pump (AFW) P-140 tripped on overspeed and AFW Pump P-504 tripped on overcurrent.
- There is **NO** AFW flow indication available in the Control Room.
- The PPEO reports the following from the AFW Pump Room:
    - P-141 suction pressure is ~12 psig
    - P-141 discharge pressure is ~1100 psig.

Which ONE (1) of the following identifies the feedwater flow to the Steam Generator(s)?

Feedwater is being supplied to…

A. E-088 and E-089 at ≥ 400 gpm.

B. E-088 only at < 400 gpm.

C. E-089 only at ≥ 400 gpm.

D. E-088 and E-089 at < 400 gpm.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Plausible because flowrate is correct, however, E-088 will only receive flow when the discharge cross-connects are opened.

B. Incorrect. E-088 will only receive flow when the discharge cross-connects are opened.

C. Correct. With P-141 ΔP less than 1230 psig, feed flow is in excess of 400 gpm.

D. Incorrect. With P-141 ΔP less than 1230 psig, feed flow is in excess of 400 gpm and E-088 will only receive flow when the discharge cross-connects are opened.

Technical Reference(s) SO23-13-2, Attachment 82EO707- (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # N127391
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 4, 7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	001 AA1.05	
	Importance Rating	4.3	

Ability to operate and/or monitor the following as applied to a Continuous Rod Withdrawal: Reactor trip switches

Proposed Question: Common 57

Given the following conditions:

- Unit is at 65% performing a power ascension.
- The RO is withdrawing Group 6 CEAs when a CEDMCS malfunction causes continuous withdrawal of Group 6 CEAs.
- Annunciator 50A20 - CEDMCS CONTINUOUS CEA MOTION is in alarm.

Assuming no other operator actions are taken (no manipulations of any controls / systems), which ONE (1) of the following actions is required?

A. Place the CEDMCS Selector Switch in OFF.
If CEA withdrawal continues, depress Reactor Trip Switches 2HS-9132-1 and 2HS-9132-2 to open Reactor Trip Breakers 1, 2, 5, and 6.

B. Depress Reactor Trip Switches 2HS-9132-3 and 2HS-9132-4 to open Reactor Trip Breakers 3, 4, 7, and 8.
If Reactor fails to trip, open MG Set Output Breakers by deenergizing Load Centers 2B15 and 2B16.

C. Place the CEDMCS Selector Switch in OFF.
If CEA withdrawal continues, depress Reactor Trip Switches 2HS-9132-1 through 2HS-9132-4 to open all Reactor Trip Breakers.

D. Depress Reactor Trip Switches 2HS-9132-1 through 2HS-9132-4 to open all Reactor Trip Breakers.
If Reactor fails to trip, open MG Set Output Breakers by deenergizing Load Centers 2B14 and 2B15.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Plausible because this is the correct action based on the annunciator and the EOIs, however, this combination of RTBs will not trip the Reactor.

B. Incorrect. Plausible because the MG Set breakers will open, however, this is an RNO action if the Reactor fails to trip.

C. Correct. This is the correct action based on the annunciator and the EOI.

D. Incorrect. Plausible because the Reactor will trip, however, if it failed to trip only one MG Set Breaker would open

Technical Reference(s) SO23-12-1, Step 2 (Attach if not previously provided)
SO23-3-2.19, Section 6.11
SD-SO23-510, Figure 13
SO23-15-50.A1, Alarm 50A20

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2EO701- (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 6, 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	024 AK2.03	
	Importance Rating	2.6	

Knowledge of the interrelations between the Emergency Boration and the following: Controllers and positioners

Proposed Question: Common 58

Given the following conditions:

- An ATWS has occurred at 90% power.
- An emergency boration was started in accordance with SO23-13-11, Emergency Boration of the RCS/Inadvertent Dilution or Boration.
- The feeder breaker to Bus B04 has opened.
- SIAS has NOT actuated.

Which ONE (1) of the following is the reason for the listed valve position during an emergency boration?

A. LV-0227B, VCT Outlet Valve is in MANUAL and CLOSED to prevent VCT pressure from stopping gravity feed flow.

B. LV-0227B, VCT Outlet Valve is in MANUAL and CLOSED to allow the BAMU Pump head to reach the Charging Pump suction.

C. FV-9253, Blended Makeup to VCT Isolation Valve is in MANUAL and CLOSED to prevent bypass flow from the blend tee to the VCT.

D. FV-9253, Blended Makeup to VCT Isolation Valve is in MANUAL and CLOSED to allow borated water to flow from the RWST when BAMU tanks empty.

Proposed Answer: A

Explanation (Optional):

A. Correct. With B04 unavailable, the flowpath is via gravity feed.

B. Incorrect. Plausible as this is the correct valve position, however, with Bus 2B04 (via MCC BY) power lost the BAMU Pumps are not available.

C. Incorrect. Plausible as this is the correct valve position, however, once the gravity feed path is chosen this valve position is inconsequential.

D. Incorrect. Plausible as this is the correct valve position and it is true that when the BAMU Tanks empty the RWST will be aligned, however, once the gravity feed path is chosen this valve position is inconsequential.

Technical Reference(s) SO23-13-11, Step 2d (Attach if not previously provided)
SD-SO23-390, page 124

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2AO711- (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 6, 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	028 AK1.01	
	Importance Rating	2.8	

Knowledge of the operational implications of the following concepts as they apply to the pressurizer level control system malfunctions : Pressurizer reference leg abnormalities

Proposed Question: Common 59

Given the following conditions:

- Pressurizer Level Channel X is in service.
- A leak develops on the Pressurizer Channel X reference leg.

Which ONE (1) of the following identifies the difference between indicated and actual Pressurizer level?

A. Indicated level rises; Actual level lowers.

B. Indicated level rises; Actual level rises.

C. Indicated level lowers; Actual level lowers.

D. Indicated level lowers; Actual level rises.

Proposed Answer: A

Explanation (Optional):

A. Correct. As the reference leg empties the indicated Pressurizer level will rise, the Level Control System will respond to this malfunction by opening the Letdown Control Valves.

B. Incorrect. Plausible because indicated level will rise, however, the Letdown Control Valves open rather than close.

C. Incorrect. Plausible because of misconception of effects of reference leg level to indicated level.

D. Incorrect. Plausible because of misconception of effects of reference leg level to indicated level.

Technical Reference(s) 0FD122, Chapter 2, page 18 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 5, 7

Comments:
WTSI Bank

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	036 AA2.03	
	Importance Rating	3.1	

Ability to determine and interpret the following as they apply to the Fuel Handling Incidents: Magnitude of potential radioactive release

Proposed Question: Common 60

Given the following conditions:

- Fuel Assembly J-12 has been used for two operating cycles (twice burned).

Which ONE (1) of the following conditions will result in the highest offsite release?

A. The core is being re-loaded at the beginning of life (BOL) and J-12 is dropped in the active fuel region.

B. The core is being off-loaded at the end of life (EOL) and J-12 is dropped in the active fuel region.

C. The core is being re-loaded at the BOL and J-12 is dropped near the upender.

D. The core is being off-loaded at the EOL and J-12 is dropped near the upender.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Plausible if thought that fission product inventory was higher.
B. Correct. This will result in the highest offsite release.
C. Incorrect. Plausible if thought that more damage would occur falling on the upender.
D. Incorrect. Plausible if thought that more damage would occur falling on the upender.

Technical Reference(s) UFSAR 15.7.3.9.2.2 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2AO720- (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 3, 5

Comments:
VC Summer Bank

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	037 AK3.04	
	Importance Rating	2.5	

Knowledge of the reasons for the following responses as they apply to the Steam Generator Tube Leak: Use of "feed and bleed" process

Proposed Question: Common 61

Given the following conditions:

- A Steam Generator (SG) Tube Rupture has occurred on SG E-089.
- Actions of EOI 12-4, Steam Generator Tube Rupture are in effect.
- SG E-089 level is off-scale high.
- Pressurizer level is off-scale low.
- ECCS is operating as designed.
- SG E-089 has just been isolated.
- REP-CET is 500ºF.
- RCS pressure is 1250 psia and slowly lowering.
- SG E-089 pressure is 1050 psia and slowly rising.

Which ONE (1) of the following actions is required?

A. Open SG E-089 MSIV to prevent overpressurization of the ruptured SG.

B. Commence lowering RCS pressure to initiate backflow.

C. Maintain RCS pressure greater than SG E-089 pressure to minimize RCS dilution.

D. Raise the setpoint of SG E-089 ADV to minimize radiological release.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Plausible but would cause Main Steam Lines to fill with water.
B. Correct.
C. Incorrect. Plausible but overfill is occurring. Keep safety valves from lifting by initiating backflow.
D. Incorrect. Plausible but would raise the setpoint and could potentially challenge MSSVs.

Technical Reference(s) SO23-12-4, Step 12 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # 127011
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam SONGS 2005

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	059 G2.1.2	
	Importance Rating	3.0	

Conduct of Operations: Knowledge of operator responsibilities during all modes of plant operation.

Proposed Question: Common 62

Given the following:

- The plant is at 100% power.
- NO radioactive releases are in progress.
- P-168, Radwaste Primary Pump has developed a leak while pumping 2/3 T-066, Radwaste Primary Tank contents to the Radwaste Deborating Ion Exchanger.

Which ONE (1) of the following radiation monitors will be the first to indicate the leak and what action should be taken?

A. RE-7813, Radwaste Discharge Line Monitor.
Secure Continuous Exhaust Fans A-310, A-311 and A-312 at 2L-155.
Verify the Continuous Exhaust Fan Inlet Dampers have closed at 2L-155.

B. RE-7865, Plant Vent Stack Wide Range Monitor.
Secure Continuous Exhaust Fans A-310, A-311 and A-312 at 2L-155.
Verify the Continuous Exhaust Fan Inlet Dampers have closed at 2L-155.

C. RE-7813, Radwaste Discharge Line Monitor.
Verify the Continuous Exhaust Fans A-310, A-311 and A-312 have automatically secured at 2L-155.
Close the Continuous Exhaust Fan Inlet Dampers at 2L-155.

D. RE-7865, Plant Vent Stack Wide Range Monitor.
Verify the Continuous Exhaust Fans A-310, A-311 and A-312 have automatically secured at 2L-155.
Close the Continuous Exhaust Fan Inlet Dampers at 2L-155.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Plausible because the actions are correct, however, this rad monitor will not sense the leak from T-066.

B. Correct. This is the appropriate rad monitor to detect the leak and actions required at 2L-155.

C. Incorrect. Plausible because this rad monitor is associated with liquid discharges, however, the fans are secured manually and the dampers close automatically at 2L-155.

D. Incorrect. Plausible because the rad monitor is correct and the fans do secure with an associated waste gas rad monitor alarm, however, the fans are secured manually and the dampers close automatically at 2L-155

Technical Reference(s) SD-SO23-690, page 65 (Attach if not previously provided)
SD-SO23-622, pages 55 & 57

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 11

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	068 AA1.26	
	Importance Rating	3.6	

Ability to operate and / or monitor the following as they apply to the Control Room Evacuation: Unlocking of switches and operation of AFW valves

Proposed Question: Common 63

Given the following Unit 3 conditions:

- The Control Room was evacuated 15 minutes ago due to dense smoke.
- SO23-13-2, Shutdown from Outside the Control Room is in progress.
- Attachment 9, 33 Duties is being performed to establish AFW flow to the Steam Generator E-088.
- 3MP-141, Auxiliary Feedwater Pump is the only available AFW source.
- SG 3ME-088 is at 10% narrow range level.
- SG 3ME-089 is at 65% narrow range level.

Which ONE (1) of the following sets of actions will align flow to Steam Generator 3ME-088?

A. UNLOCK and OPEN S31305MU634, 3MP-504/3MP-141 Cross-connect.
UNLOCK and OPEN S31305MU635, 3MP-141/3MP-504 Cross-connect.
Manually OPEN 3HV-4712, 3MP-504 Discharge to 3ME-088.
Manually Control 3HV-4730, 3ME-088 AFW Penetration Isolation.

B. DEPRESS 3HV-4716 Manual Trip Lever to Stop 3MP-140.
UNLOCK and OPEN S31305MU635, 3MP-141/3MP-504 Cross-connect.
Manually OPEN 3HV-4712, 3MP-504 Discharge to 3ME-088.
Manually Control 3HV-4730, 3ME-088 AFW Penetration Isolation.

C. DEPRESS 3HV-4716 Manual Trip Lever to Stop 3MP-140.
UNLOCK and OPEN S31305MU634, 3MP-504/3MP-141 Cross-connect.
Manually OPEN 3HV-4712, 3MP-504 Discharge to 3ME-088.
Manually Control 3HV-4730, 3ME-088 AFW Penetration Isolation.

D. UNLOCK and OPEN S31305MU634, 3MP-504/3MP-141 Cross-connect.
UNLOCK and OPEN S31305MU635, 3MP-141/3MP-504 Cross-connect.
Manually CLOSE 3HV-4713, 3MP-141 Discharge to 3ME-089.
Manually Control 3HV-4730, 3ME-088 AFW Penetration Isolation.

Proposed Answer: A

Explanation (Optional):

A. Correct.

B. Incorrect. Plausible because all actions are procedurally correct including tripping P-140, however, both cross-connect valves must be open for flow to occur.

C. Incorrect. Plausible because all actions are procedurally correct including tripping P-140, however, both cross-connect valves must be open for flow to occur.

D. Incorrect. Plausible because all actions are procedurally correct including isolating flow to SG E-089 because it has adequate NR level (procedure requires between 55 & 90%), however, both 3HV-4712 and 3HV-4730 must be open for flow to occur.

Technical Reference(s) SO23-13-2, Attachment 9 (Attach if not previously provided)
SD-SO23-780, Figure 1

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2AO702- (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 4, 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	076 AK3.05	
	Importance Rating	2.9	

Knowledge of the reasons for the following responses as they apply to the High Reactor Coolant Activity : Corrective actions as a result of high fission-product radioactivity level in the RCS

Proposed Question: Common 64

Given the following:

- Unit 2 is at 90% power and is scheduled for a refueling shutdown.
- Chemistry reports that gross gamma activity and fission product gases have increased in the Reactor Coolant.

Which ONE (1) of the following sets of actions will have the greatest effect at reducing fission product gases in the Reactor Coolant System?

A. Force Pressurizer Spray using PV-0100A, PZR Spray Valve.
Raise VCT hydrogen pressure and burp the VCT.
Maximize Letdown flow.

B. Force Pressurizer Spray using PV-0100A PZR Spray Valve.
Lower VCT hydrogen pressure and burp the VCT.
Minimize Letdown flow.

C. Force Pressurizer Spray using PV-0100A and PV-0100B, PZR Spray Valves.
Raise VCT hydrogen pressure and burp the VCT.
Minimize Letdown flow.

D. Force Pressurizer Spray using PV-0100A and PV-0100B, PZR Spray Valves.
Lower VCT hydrogen pressure and burp the VCT.
Maximize Letdown flow.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Plausible because raising Letdown flow will increase spraying and degassing via the VCT, however, raising VCT pressure increases the solubility of gases in solution.

B. Incorrect. Plausible because lowering VCT pressure lowers the solubility of gases in solution, however, minimizing Letdown flow will lower degassing via the VCT.

C. Incorrect. Plausible because maximum degassing will occur via the PZR, however, minimizing Letdown flow will lower degassing via the VCT and raising VCT pressure increases the solubility of gases in solution.

D. Correct. This is the correct combination of actions to maximize removal of fission product gases.

Technical Reference(s) SO23-3-2.1, L & S 4.1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	E09 EK1.2	
	Importance Rating	3.2	

Knowledge of operational implications of the following concepts as they apply to the (Functional Recovery) Normal, abnormal and emergency operating procedures associated with (Functional Recovery).

Proposed Question: Common 65

Given the following conditions:

- The crew has entered SO23-12-9, Functional Recovery.
- Preparations are being made to cooldown on Natural Circulation to Shutdown Cooling entry conditions.

Which ONE (1) of the following is the operational implication of performing a Natural Circulation cooldown in this condition?

A. Voiding in the head is NOT expected to occur.
Collapse any voids when Reactor Vessel Head level is less than 100% to prevent gas binding of the SDC Pumps when placed in service.

B. Voiding in the head is expected to occur.
Collapse the void when Reactor Vessel Head level is less than 100% to prevent disruption of Natural Circulation.

C. Voiding in the head is NOT expected to occur.
Collapse any voids when Plenum level is less than 100% to prevent disruption of Natural Circulation.

D. Voiding in the head is expected to occur.
Collapse the void when Plenum level is less than 100% to prevent gas binding of the SDC Pumps when placed in service.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Plausible because voiding is expected to occur, however, collapsing any voids that initially form in the head will impact the time to get on SDC.

B. Incorrect. Plausible because voiding is expected to occur, however, NC flow would not be disrupted until level is low in the Plenum.

C. Incorrect. Plausible because head voiding under normal circumstances is an undesirable situation, however, it will occur given the plant conditions.

D. Correct. This is the expected response when cooling down on NC while in the FR procedures..

Technical Reference(s) SO23-12-9, Step 13 (Attach if not previously provided)
SO23-14-9, Step 13 Bases

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2EO709- (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 5, 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	1	
	K/A #	G2.1.25	
	Importance Rating	2.8	

Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data.

Proposed Question: Common 66

Unit 2 is in MODE 3 with plant status as follows:

- Main Feedwater secured.
- Auxiliary Feedwater Pumps P-140 and P-504 are running to provide feedwater to the Steam Generators.
- Fire in a cable tray located in 45' Penetration Building has disabled 2LI-3204-2 (T-121 level indication) on CR 53.
- Unit 2 CRS has entered SO23-13-21, Fire.
- The CRS has directed you to proceed with SO23-13-21, Attachment 3 for local monitoring of T-120 level.
- T-121 and T-120 are cross-connected.

  - 2PI-3394L = 8.0 psig
  - 2PI-4701 = 6.5 psig
  - 2PI-4708 = 8.0 psig
  - 2PI-4734 = 7.0 psig

Which ONE (1) of the following is the fluid volume?

A. 230,990 gallons

B. 298,783 gallons

C. 358,915 gallons

D. 404,733 gallons

Proposed Answer: D

Explanation (Optional):

A. Incorrect. May arrive at this number by applying incorrect pressure and tanks not cross connected

B. Incorrect. May arrive at this number by applying incorrect number and/or tanks not cross connected

C. Incorrect. May arrive at this number by applying the wrong pressure

D. Correct.

Technical Reference(s) SO23-13-21, Attachment 3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # 127476
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	1	
	K/A #	G2.1.28	
	Importance Rating	3.2	

Knowledge of the purpose and function of major system components and controls.

Proposed Question: Common 67

Which ONE (1) of the following describes how the ATWS Diverse Scram System trips the reactor?

Pressurizer pressure exceeding…

A. 2375 psia on any 2 of 4 measurement channels are required to open both M-G set contactors to trip the Reactor.

B. 2375 psia on any 2 of 4 measurement channels are required to activate the undervoltage relay to trip the M-G set contactors to trip the Reactor.

C. 2428 psia on any 2 of 4 measurement channels are required to open both M-G set contactors to trip the Reactor.

D. 2428 psia on any 2 of 4 measurement channels are required to activate the undervoltage relay to trip the M-G set contactors to trip the Reactor.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Pressure is too low.
B. Incorrect. Pressure too low and the contactors are opened directly, not by undervoltage relays.
C. Correct.
D. Incorrect. Undervoltage scheme is not used in DSS, it is used in RPS.

Technical Reference(s) SD-SO23-520, pages 5 and 7 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # N126652
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 6, 7
_____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	1	
	K/A #	G2.1.33	
	Importance Rating	3.4	

Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.

Proposed Question: Common 68

Given the following conditions:

Unit 2 is in Mode 1.

1200	LPSI Pump P-019 declared INOPERABLE due to a failed surveillance.
1227	LPSI Pump P-021 also declared INOPERABLE due to the results of a common cause failure analysis.
1254	Plant Shutdown to Mode 3 commenced.
1319	LPSI Pump P-019 returned to OPERABLE status.
1338	LPSI Pump P-021 returned to OPERABLE status.

Which ONE (1) of the following describes the Technical Specification requirements for operation of the plant?

Plant conditions...

A. allow the plant shutdown to be terminated no earlier than 1319.

B. allow the plant shutdown to be terminated no earlier than 1338.

C. require the shutdown to Mode 3 be completed by 1827.

D. require the shutdown to Mode 3 be completed by 1927.

Proposed Answer: A

Explanation (Optional):

A. Correct. Conditions for TS 3.0.3 no longer apply.
B. Incorrect. Conditions were returned to TS 3.5.2 status at 1319.
C. Incorrect. Once condition no longer exists, do not have to comply with TS 3.0.3.
D. Incorrect. Once condition no longer exists, do not have to comply with TS 3.0.3.

Technical Reference(s) Tech Spec 3.5.2 (Attach if not previously provided)
Tech Spec 3.0.3
Tech Spec Example 1.3-2

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 10
_____

Comments:
WTSI Bank

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	2	
	K/A #	G2.2.12	
	Importance Rating	3.0	

Knowledge of surveillance procedures.

Proposed Question: Common 69

Given the following:

- A surveillance test on HPSI Pump P-017 was being performed in MODE 4.
- Plant conditions required interruption of the surveillance prior to completion of the test.
- The surveillance will be rescheduled in 1 week.

Which ONE (1) of the following describes the disposition of the surveillance documentation?

A. May be discarded since the surveillance was not completed and has been rescheduled.

B. Surveillance Operating Instruction may be marked with N/A with reasons noted.

C. Surveillance Operating Instruction comments will be completed with a notation that the surveillance was not completed.

D. Documentation will be maintained and Surveillance Operating Instruction completed upon successful completion of the surveillance.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Partial surveillances are not discarded.
B. Incorrect. Procedure needs to be completed; however, the surveillance must be noted.
C. Correct. Per SO23-3-3.
D. Incorrect. Paperwork is closed out and a new surveillance started.

Technical Reference(s) SO23-3-3, Step 6.5.9 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	2	
	K/A #	G2.2.27	
	Importance Rating	2.6	

Knowledge of the refueling process.

Proposed Question: Common 70

Which ONE (1) of the following describes the MINIMUM requirement for Source Range Nuclear Instrumentation prior to commencing core off-load in Mode 6?

	Visual in CR	Audible in CR	Audible in CTMT
A.	2	0	1
B.	2	1	1
C.	1	1	1
D.	2	2	2

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Plausible because Source Range is correct.
B. Correct. Tech Specs requires 2 OPERABLE Source Range in CR, and audible in both CR and CTMT.
C. Incorrect. Plausible because minimum is met with one SR INOPERABLE.
D. Incorrect. Plausible because Source Range is correct.

Technical Reference(s) SO23-5-1.8, L & S 4.2 (Attach if not previously provided)
Tech Spec 3.9.2 and Bases

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # N127204 (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 10
_____

Comments:
Prior to commencing core offload, a minimum of _____ audible Source Range NI channel(s) must be operable in the control room and a minimum of _____ audible Source Range NI channel(s) must be operable in containment.

A. 1 1
B. 1 2
C. 2 1
D. 2 2

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	3	
	K/A #	G2.3.4	
	Importance Rating	2.5	

Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.

Proposed Question: Common 71

A new SONGS employee has the following radiation exposure in 2007:

- Previous employer – 1825 mrem.
- Southern California Edison – 90 mrem.

Without Health Physics Manager authorization, which ONE (1) of the following is the MAXIMUM dose this employee may receive at SONGS?

A. 85 mrem

B. 175 mrem

C. 1085 mrem

D. 1910 mrem

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Represents the 2000 mrem limit, but this number is for total exposure at all facilities (3000 allowed).

B. Incorrect. Represents 2000 mrem limit, but using other facility exposure.

C. Correct. 1915 accumulated so far, the employee may receive up to 3000 mrem from all facilities combined for the year prior to requiring authorization for dose extension.

D. Incorrect. This would be correct for SONGS exposure alone, but employee would have exceeded the 3000 total threshold.

Technical Reference(s) SO123-VII-20.5, Section 6.1.4 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 12

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	3	
	K/A #	G2.3.1	
	Importance Rating	2.6	

Knowledge of 10 CFR: 20 and related facility radiation control requirements

Proposed Question: Common 72

An accessible area with a dose rate of 96 mrem per hour and contamination level of 32,550 DPM/100 CM^2 beta/gamma will be posted as a…

A. Contamination area and Radiation area

B. Contamination area and High Radiation area

C. High Contamination area and Radiation area

D. High Contamination area and High Radiation area

Proposed Answer: A

Explanation (Optional):

A. Correct. Greater than 5 but less than 100 mr/hr is radiation area, greater than 1,000/100 cm2 is contaminated area.

B. Incorrect. Plausible but must exceed 100 mr/hr to be High Radiation Area.

C. Incorrect. Plausible but must exceed 150,000 DPM/100 cm2 to be High Contamination Area.

D. Incorrect. Plausible but must exceed 150,000 DPM/100 cm2 to be High Contamination Area and 100 mr/hr to be High Radiation Area.

Technical Reference(s) SO123-VII-20, Attachment 1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # _____

Modified Bank # N127113 (Note changes or attach parent)

New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 12

Comments:
While reviewing an REP, an operator on tour of the plant notes one accessible area that may be entered has a dose rate of 1073 mrem/hour and contamination levels of 31,162 dpm/100 cm2 beta/gamma.
This area should be posted as a:
A. Contamination area and high radiation area
B. Contamination area and radiation area
C. High contamination area and radiation area
D. High contamination area and high radiation area

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	4	
	K/A #	G2.4.45	
	Importance Rating	2.9	

Knowledge of fire protection procedures.

Proposed Question: Common 73

Given the following:

- A fire has occurred in the Unit 2 Turbine Building 30' Switchgear Room.
- The Ops Fire Technical Advisor informs the Shift Manager in the Control Room that the Fire Department Incident Commander intends to use water to extinguish the fire.
- Some of the switchgear in the area is still energized.

Which ONE (1) of the following correctly describes the action that will be taken?

A. Prohibit the use of water as an extinguishing agent in the vicinity of all electrical components, whether energized or deenergized.

B. Inform the Incident Commander an alternate fire suppression agent must be used if any energized switchgear is actively involved in the fire.

C. Permit the use of water as a fire suppression agent only after all switchgear in the area has been completely deenergized.

D. Ensure the Incident Commander is aware of the energized switchgear, and let the Incident Commander determine the most appropriate extinguishing agent.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Should inform but do not direct. Control room has no authority in local fire control.

B. Incorrect. Incident Commander will decide.

C. Incorrect. Incident Commander will decide, but control room may elect to deenergize equipment.

D. Correct. Incident Commander is responsible to determine the types of suppression required for the fire in progress.

Technical Reference(s) SO23-13-21, Step 4.10 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 10

Comments:
WTSI Bank

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	4	
	K/A #	G2.4.7	
	Importance Rating	3.1	

Knowledge of event based EOP mitigation strategies.

Proposed Question: Common 74

Given the following:

- A Steam Generator Tube Rupture has occurred.
- The crew is performing EOI SO23-12-4, Steam Generator Tube Rupture.
- RCS cooldown is in progress.

Which ONE (1) of the following describes the strategy for maintaining RCS pressure and temperature during the cooldown?

A. Maintain subcooling in the lower end of the P/T limits to allow backflow of ruptured SG into the RCS to prevent lifting SG safety valves.

B. Maintain subcooling in the lower end of the P/T limits to minimize RCS leakage.

C. Maintain subcooling in the higher end of the P/T limits to ensure continued RCP operation.

D. Maintain subcooling in the higher end of the P/T limits to prevent steam bubble formation in the reactor vessel head.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. During the RCS cooldown, allowing backflow would likely be violating the P/T limits. Backflow is not initiated until cooldown and depressurization are complete.

B. Correct.

C. Incorrect. RCP operation is maintained at any point within the limits of the curve

D. Incorrect. As long as you are within the limits, saturation should not be an issue under the head if cooldown rate is maintained and RCPs are operating.

Technical Reference(s) SO23-14-4, Step 12 Bases (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # N11606 (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 10

Comments:
Although this is a symptom based EOP, question test criteria directly related to the SGTR event. SONGS has no 'event' based EOPs.

Comments:
SO23-12-4, "Steam Generator Tube Rupture" cautions the operators to maintain Post Accident Pressurizer Pressure and Reactor Coolant System Temperature within cooldown limits.
Which of the following describes why you want to maintain Post Accident Pressure and Temperature Limits at the lower end of the limits?

A. Reduces the amount of leakage from the Reactor Coolant System to the affected steam generator.
B. Reduces the amount of feed water inventory required for the affected steam generator.
C. Reduces the amount of feed water inventory required for the unaffected steam generator.
D. Reduces the amount of leakage from the affected steam generator to the Reactor Coolant System.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	4	
	K/A #	G2.4.10	
	Importance Rating	3.0	

Knowledge of annunciator response procedures.

Proposed Question: Common 75

Which ONE (1) of the following annunciator window colors describes an 'equipment priority' alarm condition that can potentially affect the ability of a major system to perform its function?

A. RED

B. AMBER

C. WHITE

D. BLUE

Proposed Answer: B

Explanation (Optional):

A. Incorrect. System priority alarm.
B. Correct.
C. Incorrect. Control Room assessment alarm.
D. Incorrect. Delegated assessment alarm.

Technical Reference(s) ARPs (generic info) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 10

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	007 EA2.04	
	Importance Rating		4.6

Ability to determine or interpret the following as they apply to a reactor trip: If reactor should have tripped but has not done so, manually trip the reactor and carry out actions in ATWS EOP

Proposed Question: SRO 76

Given the following:

- A manual Reactor trip was initiated.
- All Full-length CEAs remain out.
- An operator has been dispatched to open the Reactor Trip circuit breakers locally.
- The RO is attempting to establish RCS boration. Flow has NOT been verified.
- Reactor power is stable at 56%.

What are the proper actions by the operating crew in response to this event?

Continue attempts to emergency borate the RCS…

A. and immediately go to SO23-12-2, Reactor Trip Recovery.

B. and immediately go to SO23-12-9, Functional Recovery

C. complete the Standard Post Trip Actions, and diagnose a Reactor Trip Recovery event.

D. complete the Standard Post Trip Actions, and diagnose a Functional Recovery entry.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Reactivity control is satisfied if a boration is in progress, but in this case it is not. Immediate transition not called for in SPTAs.

B. Incorrect. Immediate transition not required, and Reactivity Control is not satisfied. Complete SPTAs.

C. Incorrect. Would be correct if Reactivity Control was satisfied but it is not.

D. Correct. Reactivity Control is NOT satisfied.

Technical Reference(s) SO23-12-1, Attachment 1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 22484 (As available)

Question Source: Bank # ____
Modified Bank # N3927 (Note changes or attach parent)
New ____

Question History: Last NRC Exam ____

Question Cognitive Level: Memory or Fundamental Knowledge ____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 ____
55.43 X

Comments:
The Reactor has tripped and four (4) Full-length CEAs are stuck out. After opening the Reactor Trip circuit breakers locally, two (2) CEAs fall in. Reactor power is lowering and startup rate is negative.

What are the proper actions by the operating crew in response to this event?

A. Emergency borate the RCS, and immediately go to SO23-12-9, Functional Recovery.
B. Emergency borate the RCS, and immediately go to the SO23-12-2, Reactor Trip Recovery.
C. Emergency borate the RCS, finish the Standard Post Trip Actions, and diagnose a Functional Recovery entry.
D. Emergency borate the RCS, finish the Standard Post Trip Actions, and diagnose a Reactor Trip Recovery event.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	015 AA2.07	
	Importance Rating		2.9

Ability to determine and interpret the following as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow): Calculation of expected values of flow in the loop with RCP secured

Proposed Question: SRO 77

Given the following:

- Unit 2 is at 100% power.
- RCP 2P-003 must be removed from service due to Controlled Bleedoff leakage into Containment of approximately 6 GPM.

Which ONE (1) of the following describes the procedure flowpath that will be required to remove 2P-003 RCP and the flow indication that will be available when the RCP is tripped?

A. Trip the reactor and enter EOI-SO23-12-1, SPTAs; Flow in the affected loop is reduced by approximately half.

B. Initiate a controlled plant shutdown in accordance with SO23-5-1.7, Power Operation; Flow in the affected loop is reduced by approximately half.

C. Trip the reactor and enter EOI-SO23-12-1, SPTAs; Flow in the affected loop is reversed.

D. Initiate a controlled plant shutdown in accordance with SO23-5-1.7, Power Operation; Flow in the affected loop is reversed.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Trip required for leakage >10 GPM.
B. Correct. Tripping 1 of 2 RCPs in the loop, flow will be approximately half.
C. Incorrect. Wrong procedure and No reverse flow with 1 RCP running.
A. Incorrect. No reverse flow.

Technical Reference(s) SO23-13-6, Step 3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	027 G2.1.2	
	Importance Rating		4.0

Conduct of Operations: Knowledge of operator responsibilities during all modes of plant operation.

Proposed Question: SRO 78

Given the following conditions:

- Unit 3 is at 100% power.
- PV-0100A, PZR Spray Valve from Loop A, is open approximately 40%.
- RCS pressure is 2200 psig and trending down at 10 psi per minute.

Which ONE (1) of the following identifies:

a.) The Technical Specification Safety Limit may be challenged by this event?

b.) What action should be taken to mitigate the situation?

A. a. Linear Heat Rate
b. Trip the reactor; enter SO23-12-1, SPTAs; trip the RCPs in Loop A when Reactivity Control is verified.

B. a. Linear Heat Rate
b. Attempt to close the Spray Valve in accordance with AOI SO23-13-27, Pressurizer Pressure and Level Control Malfunction.

C. a. DNBR
b. Attempt to close the Spray Valve in accordance with AOI SO23-13-27, Pressurizer Pressure and Level Control Malfunction.

D. a. DNBR
b. Trip the reactor; enter SO23-12-1; trip all RCPs when Reactivity Control is verified.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. LHR limit challenged by CEA problems. Action would be alternate in case initial action did not work.
B. Incorrect. LHR limit challenged by CEA problems.
C. Correct.
D. Incorrect. Action not required until initial action is unsuccessful.

Technical Reference(s) SO23-13-27, Step 3 (Attach if not previously provided)
Tech Spec Section 2.0 Bases

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 19443 (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam SONGS 2006

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 2, 5

Comments:
WTSI Bank

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	038 G2.1.30	
	Importance Rating		3.4

Conduct of Operations: Ability to locate and operate components, including local controls.

Proposed Question: SRO 79

Given the following:

- A Steam Generator Tube Rupture has occurred on SG E-088.
- The crew has completed actions of SO23-12-1, SPTAs, and has transitioned to SO23-12-4, Steam Generator Tube Rupture.
- P-141, AFW Pump is tripped and cannot be restarted.
- The Turbine Driven AFW Pump P-140 is out of service.
- All other equipment is running as required.

Which ONE (1) of the following describes the action that will be performed to ensure availability of a secondary heat sink?

A. Remain in SO23-12-4; locally unlock and open AFW cross-connect valves to feed SG E-089.

B. Transition to SO23-12-9, Functional Recovery; locally unlock and open AFW cross-connect valves to feed SG E-089.

C. Remain in SO23-12-4; Perform the RCS cooldown by steaming SG E-088.

D. Transition to SO23-12-9, Functional Recovery, and perform the RCS cooldown by steaming SG E-088.

Proposed Answer: A

Explanation (Optional):

A. Correct. Preferable to open X-conn valves than to contaminate the atmosphere.
B. Incorrect. Wrong procedure, correct action. Plausible because applicant may believe there is a dual event (Loss of feed)
C. Incorrect. Wrong action.
D. Incorrect. Wrong procedure and action.

Technical Reference(s) SO23-12-4, Step 8 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	058 AA2.02	
	Importance Rating		3.6

Ability to determine and interpret the following as they apply to the Loss of DC Power: 125V dc bus voltage, low/critical low, alarm

Proposed Question: SRO 80

Given the following conditions:

- Unit 2 is at 100% power.
- Pressurizer Pressure and Level Control are both selected to Channel X.
- Annunciator 63A32 - 2D1 125 VDC BUS TROUBLE alarms in the Control Room.
- DC Bus 2D1 indicates 105 VDC.

Which ONE (1) of the following is the impact on plant operations and what are the procedural implications?

A. Unit 3 RCP 3P-001 cannot be tripped from the Control Room. Refer to SO23-3-1.7, Reactor Coolant Pump Operation to transfer control power from Unit 2 to Unit 3.

B. Bus 2D1 is grounded. Refer to SO23-6-33, Ground Isolation to isolate the ground.

C. Stop Charging Pumps and heaters to control Pressurizer level and pressure per SO23-13-27, Pressurizer Pressure and Level Malfunction.

D. DC Control power to Bus 2A04 has been compromised. Refer to SO23-6-15, Operation of 125 VDC Systems to place the battery on an equalizing charge.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Plausible because the Unit 3 RCPs are normally supplied from the Unit 2 DC Bus and vice versa, however, DC Bus D5 is the source of control power.

B. Incorrect. Plausible because this annunciator can be an indication of a ground, however, there is insufficient information to make this determination.

C. Incorrect. Plausible because Channel X is in service and Vital Bus Y-001 could be affected, however, there is no indication that VAC is lost.

D. Correct.

Technical Reference(s) SO23-6-15, Section 6.6 (Attach if not previously provided)
SO23-3-1.7, Attachment 8
SO23-15-63.A, 63A32

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 5

Comments:

Examination Outline Cross-reference:

Level	RO	SRO
Tier #		1
Group #		1
K/A #	E06 G2.1.23	
Importance Rating		4.0

Conduct of Operations: Ability to perform specific system and integrated plant procedures during all modes of plant operation.

Proposed Question: SRO 81

Given the following conditions:

- Unit 2 has tripped following a Bus 2A07 overcurrent trip and loss of vacuum.
- Auxiliary Feedwater Pump P-141 breaker will not close and P-504 was cleared for Boundary of the Week.
- Auxiliary Feedwater Pump P-140 is running but cannot develop sufficient discharge head.
- The CRS has completed SO23-12-1, Standard Post Trip Actions and has transitioned to SO23-12-6, Loss of Feedwater.
- The cause of the loss of vacuum was identified and vacuum is restored.
- Main Feedwater Pump P-062 was reset and available for feeding.

Shortly after entry into SO23-12-6, the following occurs:

- Annunciator 57C57 - TURBINE BLDG FLOODING has just alarmed.
- A Main Feedwater pipe break was verified between the Turbine Building and the Safety Equipment Building.

Which ONE (1) of the following actions is required?

A. Isolate Main Feedwater system break outside Containment.
Implement SO23-12-9, Functional Recovery.
Initiate Attachment FR-5, Recovery - Heat Removal success path HR-1.

B. Initiate MSIS and CIAS.
Remain in SO23-12-6, Loss of Feedwater and transition to Step 10, Establish Condensate Pump flow to Available SGs.
Align a Condensate Pump and depressurize the Steam Generators to 500 psig.

C. Isolate Main Feedwater system break outside Containment.
Remain in SO23-12-6, Loss of Feedwater and transition to Step 10, Establish Condensate Pump flow to Available SGs.
Align a Condensate Pump and depressurize the Steam Generators to 500 psig.

D. Initiate MSIS and CIAS.
Implement SO23-12-9, Functional Recovery.
Initiate Attachment FR-5, Recovery - Heat Removal success path HR-1.

Proposed Answer: A

Explanation (Optional):

A. Correct. This is the correct response per the RNO.
B. Incorrect. MSIS and CIAS not required, Go to FR.
C. Incorrect. Go to FR. Condensate will not be useful if feed header is isolated.
D. Incorrect. MSIS and CIAS not required.

Technical Reference(s) SO223-12-6, Step 8b (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # N127441
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #	024 AA2.01	
	Importance Rating		4.1

Ability to determine and interpret the following as they apply to the Emergency Boration: Whether boron flow and/or MOVs are malfunctioning, from plant conditions

Proposed Question: SRO 82

Given the following:

- Unit 2 is in Mode 6.
- Refueling activities are in progress.
- Chemistry sample indicates Refueling Cavity boron concentration is below the Technical Specification limit.

Which ONE (1) of the following describes the action required, assuming all equipment operates as required?

A. Initiate boration at a minimum flow of 80 GPM using SO23-3-2.2, Makeup Operations. Boration flow may be verified by BAMU tank level trend.

B. Initiate boration at a minimum flow of 40 GPM using SO23-3-2.2, Makeup Operations. Boration flow may be verified by RWST level trend.

C. Initiate boration at a minimum flow of 80 GPM using SO23-13-11, Emergency Boration of the RCS/Inadvertent Dilution or Boration. Boration flow may be verified by RWST level trend.

D. Initiate boration at a minimum flow of 40 GPM using SO23-13-11, Emergency Boration of the RCS/Inadvertent Dilution or Boration. Boration flow may be verified by BAMU Tank level trend.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Wrong procedure and 80 GPM is flow from 2 charging pumps. Only 1 required.
B. Incorrect. Wrong procedure and wrong source of water.
C. Incorrect. Wrong source of water and only 1 charging pump required if all equipment is operating properly.
D. Correct. Enter SO23-13-11 for boron less than 2600 ppm during refueling. If all equipment operates normally, 40 GPM from BAMU tank will provide adequate boration.

Technical Reference(s) SO23-13-11, Step 2b & 2j (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #	061 G2.1.12	
	Importance Rating		4.0

Ability to apply technical specifications for a system

Proposed Question: SRO 83

Given the following:

- Unit 2 is in MODE 3 during a preparation for a Reactor startup.
- It has been determined that BOTH Containment High Range Radiation monitors, 2-RI-7820-1 and 2-RI-7820-2 are INOPERABLE.

Which ONE (1) of the following describes the action required? (Reference provided.)

A. Be in MODE 4 within 12 hours.

B. Maintain MODE 3 conditions until at least 1 channel is restored to OPERABLE.

C. The startup may continue; ONE channel must be restored within 7 days.

D. The startup may continue; ONE channel must be restored within 30 days.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Action provided for in the Tech Spec, but not for Function H.
B. Incorrect. Action not required for function H and 3.0.4 does not apply to this Tech Spec.
C. Correct.
D. Incorrect. Plausible because this is correct action for 1 channel out of service.

Technical Reference(s) Tech Spec 3.3.11 (Attach if not previously provided)
Tech Spec Table 3.3.11-1

Proposed references to be provided to applicants during examination: Tech Spec 3.3.11 and Table 3.3.11-1

Learning Objective: _____ (As available)

Question Source:	Bank #		
	Modified Bank #		(Note changes or attach parent)
	New	X	
Question History:	Last NRC Exam		
Question Cognitive Level:	Memory or Fundamental Knowledge		
	Comprehension or Analysis	X	
10 CFR Part 55 Content:	55.41		
	55.43	2	

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #	069 AA2.01	
	Importance Rating		4.3

Ability to determine and interpret the following as they apply to the Loss of Containment Integrity: Loss of containment integrity

Proposed Question: SRO 84

During a refueling outage with fuel movement in progress, which ONE (1) of the following would be considered a loss of Containment Closure?

A. Containment equipment hatch held in place by only 7 bolts.

B. Both Containment Personnel Airlock doors simultaneously open.

C. Containment Purge valves are open with a Purge in progress

D. SG Secondary side manways off and a main steam safety is removed.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Equipment Hatch requires 4 bolts.
B. Incorrect. Airlock doors may be open in MODE 6 as long as capable of being closed and other restrictions met (Cavity level).
C. Incorrect. Purge may be in progress as long as rad monitors remain capable of isolating it if necessary.
D. Correct. Provides for a direct path to atmosphere that cannot be immediately isolated.

Technical Reference(s) Tech Spec 3.9.3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 _____
55.43 2

Comments:
Millstone Exam Bank

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #	A13 G2.1.32	
	Importance Rating		3.8

Conduct of Operations: Ability to explain and apply all system limits and precautions.

Proposed Question: SRO 85

Given the following:

- A complete loss of Component Cooling required a Reactor trip.
- All other actions required by SO23-13-7, Loss of CCW/SWC have been completed.
- The crew is preparing to transition from SPTAs to initiate RCS Cooldown to Cold Shutdown.

Which ONE (1) of the following describes the procedure transition from SPTAs and the procedure and strategy required for the cooldown?

A. SO23-12-2, Reactor Trip Recovery; cooldown will be performed using SO23-5-1.5, Plant Cooldown from Hot Standby to Cold Shutdown.

B. SO23-12-2, Reactor Trip Recovery; cooldown will be performed using SO23-12-11, Attachment 3, Cooldown/Depressurization.

C. SO23-12-7, Loss of Off-Site Power/Loss of Forced Circulation; cooldown will be performed using SO23-12-11, Attachment 3, Cooldown/Depressurization. Minimizing Reactor vessel upper head voids takes priority over RCS P/T limits during the cooldown.

D. SO23-12-7, Loss of Off-Site Power/Loss of Forced Circulation; cooldown will be performed using SO23-12-11, Attachment 3, Cooldown/Depressurization. RCS P/T limits take priority over minimizing Reactor vessel upper head voids during the cooldown.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Wrong procedure for RCPs tripped. Cooldown procedure could be correct if 12-2 was used.

B. Incorrect. Wrong procedure for RCPs tripped.

C. Incorrect. Correct procedure but wrong priority.

D. Correct. Loss of CCW, all RCPs will be tripped.

Technical Reference(s) SO23-12-7, Step 14 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #	004 G2.1.23	
	Importance Rating		4.0

Conduct of Operations: Ability to perform specific system and integrated plant procedures during all modes of plant operation.

Proposed Question: SRO 86

Given the following:

- Unit 2 is at 100% power.
- PZR level control is selected to Channel X.
- Letdown is slowly lowering, and currently indicates approximately 36 GPM.
- VCT automatic makeup is in progress.

Which ONE (1) of the following describes the event in progress, and the next action required?

A. RCS Leak; Enter SO23-13-14, RCS Leak and start additional Charging Pumps.

B. RCS Leak; Enter SO23-13-14, RCS Leak and isolate Letdown.

C. PZR Level Control System Malfunction; Enter SO23-13-27, Pressurizer Pressure and Level Malfunction and switch control to Channel Y.

D. PZR Level Control System Malfunction; Enter SO23-13-27, Pressurizer Pressure and Level Malfunction and place LIC-0110, PZR Level Controller in MANUAL.

Proposed Answer: A

Explanation (Optional):

A. Correct. Indications are of an RCS leak because VCT Makeup indicates that a loss of inventory is occurring as well as the Letdown flow at minimum

B. Incorrect. Correct procedure, but would only isolate letdown if all Charging pumps were running and level not stable

C. Incorrect. Wrong failure. If VCT level was stable, this could be chosen, but controller would be placed in manual first.

D. Incorrect. Plausible because the symptoms lead to a control channel failure with the exception of VCT AND letdown simultaneously being abnormal.

Technical Reference(s) SO23-13-14, Steps 1 & 2 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #	005 A2.04	
	Importance Rating		2.9

Ability to (a) predict the impacts of the following malfunctions or operations on the RHRS, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: RHR valve malfunction

Proposed Question: SRO 87

Given the following:

- Unit 2 is in MODE 4.
- RCS temperature is 310ºF.
- Train "A" Shutdown Cooling is in service.
- RCS Cooldown rate is 20ºF per hour.
- Total Shutdown Cooling flow is 2700 GPM.

Subsequently, an event occurs resulting in the following:

- Shutdown Cooling flow drops to 2050 GPM.
- RCS temperature begins to rise slowly.

Which ONE (1) of the following describes the event that has occurred, and the action required?

Mechanical failure of…

A. SDC Heat Exchanger Outlet Valve HV-8150; Enter SO23-13-15, Loss of Shutdown Cooling, and establish Shutdown Cooling on Train B

B. SDC Heat Exchanger Outlet Valve HV-8150; Refer to SO23-3-2.6, Shutdown Cooling System Operations, to reestablish Shutdown Cooling flow to its previous value.

C. SDC HX Bypass Flow Control Valve HV-8160; Enter SO23-13-15, Loss of Shutdown Cooling, and re-establish flow with the Alternate Bypass Valve, HV-0396

D. SDC HX Bypass Flow Control Valve HV-8160; Refer to SO23-3-2.6, Shutdown Cooling System Operations, to re-establish flow with the Alternate Bypass Valve, HV-0396.

Proposed Answer: A

Explanation (Optional):

A. Correct. If RCS temperature is rising, then HX Cooling flow must be lower, so that flowpath is affected. If there is mechanical failure of that outlet valve and SDC temperature is rising, go to AOI and swap trains.

B. Incorrect. Wrong procedure.

C. Incorrect. Wrong failure. If the bypass closed, SDC temperature would not be rising.

D. Incorrect. Wrong failure, wrong procedure.

Technical Reference(s) SO23-13-15, Steps 3c & 5c (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #	006 G2.1.20	
	Importance Rating		4.2

Conduct of Operations: Ability to execute procedure steps.

Proposed Question: SRO 88

Given the following conditions:

- Unit 2 has tripped after Offsite Power was lost.
- SIAS has actuated and all equipment is operating as designed, including ECCS.
- The crew is performing the actions of SO23-12-3, Loss of Coolant Accident.
- While evaluating FS-7, Verify SI Throttle/Stop Criteria, the following parameters are observed:
    - SG pressures are 1000 psia.
    - SG narrow range levels are approximately 22% and trending upwards.
    - Pressurizer Level is 55% and rising.
    - Core Exit Saturation Margin is 9ºF.
    - Reactor Vessel Level is 100% Plenum.
    - Containment pressure is 1.2 psig and rising SLOWLY.

Which ONE (1) of the following describes the action required per FS-7, Verify SI Throttle/Stop Criteria?

A. Initiate FS-32, Monitor RCS Solid Operation, and FS-30, Establish CVCS Letdown.

B. Stop HPSI pumps to limit the rise in Pressurizer level to avoid a Pressurized Thermal Shock transient. Initiate FS-30, Establish CVCS Letdown Flow and start all Charging Pumps.

C. Continue monitoring SI Throttle/Stop criteria. Throttle or stop HPSI one train at a time when all of the criteria are met.

D. Stop Charging and LPSI Pumps. Reset SIAS and ensure CIAS, CCAS, and CRIS are actuated. Throttle or stop HPSI one train at a time when all of the criteria are met.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Plausible because with levels increasing plant could be solid in a short period of time, however, this action would not be required until > 80% per FS-7.

B. Incorrect. Plausible because some criteria are met, however, cannot secure HPSI Pumps until all criteria are met.

C. Correct. Actions are correct once criteria have been met.

D. Incorrect. Plausible as it is partially correct, however, cannot secure Charging Pumps until all criteria are met.

Technical Reference(s) SO23-12-11, FS-7 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2EO711 or 2EO704 (As available)

Question Source: Bank # N126589
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #	006 G2.2.25	
	Importance Rating		3.7

Equipment Control Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.

Proposed Question: SRO 89

Given the following MODE 1 conditions:

- SIT T-008 pressure is 618 psig.
- SIT T-008 boron concentration is 2788 ppm.
- SIT T-009 pressure is 653 psig.
- SIT T-009 boron concentration is 2198 ppm.

Which ONE (1) of the following describes the potential Technical Specification impact of this condition?

A. SIT T-008 pressure may not be adequate to ensure injection at a flow rate sufficient to meet accident analysis assumptions.

B. SIT T-008 boron solubility concerns may adversely affect ECCS flow analysis assumptions.

C. SIT T-009 pressure may result in excessive amounts of gas being introduced into the RCS after SIT injection.

D. SIT T-009 boron concentration may not be adequate to prevent return to criticality in the reflood phase of a design basis LOCA.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. In spec, but correct basis if it was not.
B. Incorrect. In spec, but correct basis if it was not.
C. Incorrect. In spec, but correct basis if it was not.
D. Correct.

Technical Reference(s) Tech Spec 3.5.1 (Attach if not previously provided)
Tech Spec 3.5.1 Bases

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 _____
55.43 2

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #	062 A2.12	
	Importance Rating		3.6

Ability to (a) predict the impacts of the following malfunctions or operations on the ac distribution system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Restoration of power to a system with a fault on it

Proposed Question: SRO 90

Given the following:

- A Station Blackout has occurred.
- The crew is performing EOI SO23-12-8, Blackout.
- SO23-12-11, Attachment 8, Restoration of Off-Site Power, is in progress.
- While performing Attachment 8, the following alarm is identified:
    - 63C21 - RES XFMR XR2 PROTECTION TRIP

Which ONE (1) of the following actions is appropriate for this condition?

A. Verify the System Separation Alarm is reset, then reset 63C21 and continue in Attachment 8.

B. Initiate SO23-6-6, Reserve Auxiliary Transformer Operation, Attachment for Emergency Faulted Reserve Auxiliary Transformer Operations.

C. Initiate SO23-6-6, Reserve Auxiliary Transformer Operation, to remove Generator Iso-Phase Bus disconnects to allow use of the Main Transformers.

D. Stop performance of Attachment 8, initiate repairs to XR2, and continue attempting restoration of EDGs in accordance with SO23-12-8, Station Blackout.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Actions are performed in procedure, but will not mitigate the transformer trip.
B. Correct.
C. Incorrect. Wrong procedure use for correct alternate action.
D. Incorrect. May continue if you can make use of SO23-6-6. No need to stop Attachment 8.

Technical Reference(s) SO23-12-11, Attachment 8 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 5

Comments:

Examination Outline Cross-reference:

Level	RO	SRO
Tier #		2
Group #		2
K/A #	017 A2.01	
Importance Rating		3.5

Ability to (a) predict the impacts of the following malfunctions or operations on the ITM system; and (b) based on those predictions, use procedures to correct, control or mitigate the consequences of those malfunctions or operations: Thermocouple open and short circuits

Proposed Question: SRO 91

Given the following on Unit 2:

TIME	DATE	CONDITION
0600	6/11/2007	1 required channel of Core Exit Thermocouples was declared INOPERABLE in Quadrant 2 due to CETs reading off-scale low.
1130	6/14/2007	1 required channel of Core Exit Thermocouples was declared INOPERABLE in Quadrant 4 due to CETs reading off-scale low.
1200	6/17/2007	Quadrant 2 was returned to full operability.
1400	6/18/2007	1 additional required channel of Core Exit Thermocouples was declared INOPERABLE in Quadrant 4 due to CETs reading off-scale low.

Which ONE (1) of the following describes the LATEST time that the Unit is required to be in MODE 3, and the reason why?

(Reference Provided)

A. 2000 on 6/18/2007 due to inoperability because of shorted thermocouples ONLY.

B. 2000 on 6/18/2007 due to inoperability because of shorted OR open thermocouples.

C. 2000 on 6/25/2007 due to inoperability because of shorted thermocouples ONLY.

D. 2000 on 6/25/2007 due to inoperability because of shorted OR open thermocouples.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Plausible because it allows for 6 hours to hot standby, just doesn't allow for the initial 7 days. Shorted TCs would indicate low, and open would also.

B. Incorrect. Plausible for same reason as A and also gives indication of open or shorted thermocouples.

C. Incorrect. Correct time but open thermocouples would indicate low also.

D. Correct. Cannot meet minimum, 7 days is time. If cannot meet 7 days, Hot Standby in 6 hours. Off-Scale low indication can be a result of shorted or open thermocouples.

Technical Reference(s) Tech Spec 3.3.11 (Attach if not previously provided)
Tech Spec Table 3.3.11-1

Proposed references to be provided to applicants during examination: Tech Spec 3.3.11 and Table 3.3.11-1

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 2

Comments:
McGuire Exam Bank

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #	041 G2.4.49	
	Importance Rating		4.0

Emergency Procedures / Plan Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.

Proposed Question: SRO 92

Given the following conditions:

- Unit is at 100% power.
- Steam Bypass Control System (SBCS) is in AUTO.
- SBCS Master Controller is in REMOTE.
- All SBCS Valve Permissives are in AUTO when the following occurs:
  - 2HV-8423, SBCS Valve fails fully open.

Which ONE (1) of the following is the quickest method for closing the valve and what procedure would be entered?

A. Position SBCS Master Controller to MANUAL, raise the output, and refer to SO23-3-2.18, SBCS Operation for guidance on placement of permissive switches.

B. Place 2HV-8423 Permissive Switch in OFF and enter SO23-12-1, Standard Post Trip Actions due to a high linear power trip.

C. Position SBCS Master Controller to LOCAL, lower the output, and refer to SO23-3-2.18, Steam Bypass Control System Operation for guidance on placement of permissive switches.

D. Place 2HV-8423 Permissive Switch in MANUAL and enter SO23-12-1, Standard Post Trip Actions due to a high linear power trip.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Plausible and operationally allowable, however, this condition should be avoided as it defeats the single failure design of the SBCS. Procedural guidance is correct for condition listed.

B. Correct. Placing the Permissive Switch in OFF will close the valve. This will be accompanied by a high power trip.

C. Incorrect. Plausible and operationally allowable, however, this condition requires the Permissive Switch in MANUAL to prevent valve cycling on the Permissive relay. Procedural guidance is correct for condition listed.

D. Incorrect. Plausible if problem is not associated with the Permissive switch, however, in this condition the Master Controller should be in LOCAL. Procedural guidance is correct because valve would stay open and a Reactor trip would occur.

Technical Reference(s) SO23-3-2.18, L & S 3.0 (Attach if not previously provided)
SO23-3-2.18, Step 14.3.10
SO23-12-1, Entry Conditions

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2XIR05- (As available)

Question Source: Bank # N2777
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 5, 6

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #	056 G2.1.28	
	Importance Rating		3.3

Conduct of Operations: Knowledge of the purpose and function of major system components and controls.

Proposed Question: SRO 93

Given the following conditions:

- Unit 3 is at 100% power.
- All four Circulating Water Pumps are operating.
- Full-Flow Condensate Polishing Demineralizers (FFCPD) are in service.
- The following Annnunciators are in alarm:
  - 52A32 - CONDENSATE CATION CONDUCTIVITY HIGH
  - 52A34 - FEEDWATER CATION CONDUCTIVITY HI
  - 52A42 - CONDENSER NE HOTWELL CONDUCTIVITY HI
- Chemistry reports Condensate Cation Conductivity > 10 µS/cm.

Which ONE (1) of the following responses and associated reasons should be performed?

A. Place LV-3245, Condensate Drawoff Valve in DISABLE to preserve Condensate inventory.
Perform a Rapid Power Reduction per SO23-5-1.7, Power Operations to preserve Main Feedwater Pump NPSH while overboarding.
Secure NE Condenser Circulating Water Pump after the power reduction to comply with NPDES limits.

B. Place LV-3245, Condensate Drawoff Valve in DISABLE to prevent contamination of T-120, Condensate Storage Tank.
Initiate a Reactor and Turbine trip per SO23-12-1, Standard Post Trip Actions to preserve FFCPD.
Stop the NE Condenser Circulating Water Pump to minimize introduction of contaminants.

C. Place LV-3245, Condensate Drawoff Valve in DISABLE to preserve Condensate inventory.
Secure NE Condenser Circulating Water Pump to comply with NPDES limits.
Initiate a Reactor and Turbine trip per SO23-12-1, Standard Post Trip Actions to minimize chloride buildup in the Steam Generators.

D. Place LV-3245, Condensate Drawoff Valve in DISABLE to prevent contamination of T-120, Condensate Storage Tank.
Stop the NE Condenser Circulating Water Pump to minimize introduction of contaminants.
Perform a Rapid Power Reduction per SO23-5-1.7, Power Operations to preserve Main Feedwater Pump NPSH while overboarding.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Plausible because actions are required, however, Drawoff valve will prevent contamination and CW Pump should be immediately secured.

B. Incorrect. Plausible because actions would minimize contamination, however, with the adjacent CW Pump operating a Reactor trip is not required.

C. Incorrect. Plausible because tripping would minimize contamination of SG, however, FFCPD is in service and with the adjacent CW Pump operating a Reactor trip is not required.

D. Correct. These are the correct actions based on the conditions.

Technical Reference(s) SO23-13-9, Steps 1 & 2 (Attach if not previously provided)
SO23-13-9, L & S 1.4

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2AO709- (As available)

Question Source: Bank # ____
Modified Bank # ____ (Note changes or attach parent)
New X

Question History: Last NRC Exam ____

Question Cognitive Level: Memory or Fundamental Knowledge ____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 ____
55.43 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		1
	K/A #	G2.1.22	
	Importance Rating		3.3

Ability to determine Mode of Operation.

Proposed Question: SRO 94

A plant cooldown is in progress on Unit 2 in preparation for Refueling.

Which ONE (1) of the following describes when the CRS will declare entry to Mode 6 in accordance with Technical Specifications?

A. When the first irradiated fuel assembly is grappled.

B. When the reactor vessel upper internals are removed.

C. When the first reactor vessel head closure bolt is detensioned.

D. When the last reactor vessel head closure bolt is detensioned.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. This represents a core alteration.
B. Incorrect. This is the first core alteration.
C. Correct.
D. Incorrect. First closure bolt is Mode 6.

Technical Reference(s) Tech Spec Table 1.1-1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source:

Bank #		
Modified Bank #		(Note changes or attach parent)
New	X	

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 _____
55.43 2

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		2
	K/A #	G2.2.10	
	Importance Rating		3.3

Knowledge of the process for determining if the margin of safety, as defined in the basis of any technical specification is reduced by a proposed change, test or experiment.

Proposed Question: SRO 95

In accordance with SO123-0-A4, Configuration Control, when is a 10CFR50.59 Safety Evaluation required?

A. In support of Maintenance activities any time equipment is placed in an alternate alignment and must be documented on a Status Control Form.

B. In support of Maintenance activities when an alternate alignment will be in place for greater than 90 days.

C. When alternate alignments are directed by plant procedures with the exception of EOPs, and the equipment will remain in the off-normal position upon completion of the procedure.

D. When alternate alignments are directed by any plant procedures, and the equipment will remain in the off-normal position upon completion of the procedure.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Only if alignment off normal for >90 days.
B. Correct.
C. Incorrect. Requires use of Status Control Form, but not 10CFR50.59 review.
D. Incorrect. Requires use of Status Control Form.

Technical Reference(s) SO123-0-A4, Step 6.5.1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 _____
55.43 4

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		2
	K/A #	G2.2.19	
	Importance Rating		3.1

Knowledge of maintenance work order requirements.

Proposed Question: SRO 96

Given the following:

- Unit 2 is in Mode 5.
- Train “B” ECCS suction piping is drained to support pipe hanger installation.
- During the same work window, motor alignment work was completed on HPSI Pump P-019.
- The work on P-019 is complete.
- An In-Service Test is required prior to declaring HPSI Pump P-019 OPERABLE.

The Work Process Supervisor will enter the Work Authorization Request in the…

A. Test Required File.

B. Procedure In Use File.

C. CCO Log with a Red Arrow entry.

D. Unit LCOAR Index.

Proposed Answer: A

Explanation (Optional):

A. Correct.
B. Incorrect. Used for procedures in use during outages. This is a WAR.
C. Incorrect. Common CO is not responsible for this equipment.
D. Incorrect. LCOAR for equipment that is in a TS action. Mode 5 HPSI not required.

Technical Reference(s) SO123-XX-5, Step 6.10.6.3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: _____ (As available)

Question Source: Bank # N10526
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 _____
55.43 4, 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		3
	K/A #	G2.3.8	
	Importance Rating		3.2

Knowledge of the process for performing a planned gaseous radioactive release.

Proposed Question: SRO 97

Given the following conditions:

- A Gaseous Waste release is planned for Unit 2.
- Wind direction is blowing from the east.

Which ONE (1) of the following describes the status of the planned release in accordance with SO23-8-15, Gaseous Effluent Release?

The release…

A. CANNOT be initiated until wind direction changes.

B. may be initiated **ONLY IF** wind speed is below the minimum required by a calculation.

C. may be initiated **ONLY IF** wind speed is above the minimum required by a calculation.

D. is DESIRABLE and may commence without restriction.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. From the east is blowing toward the ocean. Conditions are desirable.
B. Incorrect. Requires higher wind speed if wind blowing toward land.
C. Incorrect. Higher wind speed is higher dispersion factor, and would be true if wind was blowing toward land.
D. Correct. Desirable if wind is blowing towards the ocean.

Technical Reference(s) SO23-8-15, Attachment 4 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 20220 (As available)

Question Source: Bank # ____
Modified Bank # N127642 (Note changes or attach parent)
New ____

Question History: Last NRC Exam ____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis ____

10 CFR Part 55 Content: 55.41 ____
55.43 4, 5

Comments:

Given the following conditions:

- A Gaseous Waste release is planned for Unit 2.
- Wind direction is from the ocean.

Which ONE (1) of the following describes the status of the planned release in accordance with SO23-8-15, Gaseous Effluent Release? The release…

A. CANNOT be initiated until wind direction changes.

B. may be initiated **ONLY IF** wind speed is below minimum required by a calculation.

C. may be initiated ONLY IF wind speed is above the minimum required by a calculation.

D. is DESIRABLE and may commence without restriction.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		3
	K/A #	G2.3.2	
	Importance Rating		2.9

Knowledge of facility ALARA program.

Proposed Question: SRO 98

Given the following:

- You are performing an ALARA review for work to be performed.
- A point source in the Radwaste Building is reading 500 mrem/hr at distance of two (2) feet.
- Two options exist to complete rework on a valve near this radiation source.
- Option 1:
  - Operator X can perform the assignment in thirty minutes working at a distance of four feet from the point source.
- Option 2:
  - Operators Y and Z, who have been trained in the use of a special extension tool can perform the same task in 75 minutes at a distance of eight feet from the point source.

Which of the following options is preferable and consistent with the ALARA program?

A. Option 1 as X's exposure is 31.25 mrem.

B. Option 1 as X's exposure is 62.50 mrem.

C. Option 2 as the exposure per person is 19.53 mrem.

D. Option 2 as the exposure per person is 39.06 mrem.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Plausible misconception or math error for exposure.
B. Correct.
C. Incorrect. Plausible misconception or math error for exposure, and also reducing individual exposure as opposed to total exposure.
D. Incorrect. Plausible misconception of individual exposure versus total exposure.

Technical Reference(s) Lesson Plan 2LC898, page 54 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2LC898-6 (As available)

Question Source: Bank # 73817
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 3

Comments:
Modified C and D for plausibility

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		4
	K/A #	G2.4.46	
	Importance Rating		3.6

Ability to verify that the alarms are consistent with the plant conditions.

Proposed Question: SRO 99

Given the following conditions:

- Both Units are at 100% power.
- 2PI5344A and 3PI5344A, Instrument Air Header Pressure, both indicate 82 psig and lowering slowly.
- All available Instrument Air Compressors are running.

Which ONE (1) of the following alarms is consistent with current plant conditions?

A. 61B47 - RSAS SYSTEM TROUBLE; Enter SO23-1-2, Respiratory and Service Air Operation to investigate why RSAS to instrument air valve did not open.

B. 61B40 - INST AIR DRYER TROUBLE; Enter SO23-1-1, Instrument Air System Operation to blowdown the Air Receivers and Dryers.

C. 61B38 - N2 SUPPLY TO INST AIR HEADER ON; Enter SO23-13-5, Loss of Instrument Air and attempt to locate the source of the air leak.

D. 61B58 - INST AIR COMPRESSOR CONTROL PANEL TROUBLE; Enter SO23-1-1, Instrument Air System Operation to verify proper operation of the half-load selector valves.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Plausible because the RSAS to IA cross connect valve would have already opened at ~88 psig, however, this alarm is for an open feeder breaker.
B. Incorrect. Plausible because alarm comes in with low air header pressure, however, it occurs at 70 psig.
C. Correct. The N_2 check valve position switch is activated between 80 and 83 psig.
D. Incorrect. Plausible because with all compressors running this could be an indication of an air supply problem and condenser liquid level could be high which would bring in this alarm.

Technical Reference(s) SO23-15-61.B38 (Attach if not previously provided)
SO23-13-5, Step 1

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 2AO705- (As available)

Question Source: Bank # _____
Modified Bank # N127198 (Note changes or attach parent)
New _____

Question History: Last NRC Exam SONGS 2005

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 5

Comments:
Given the following conditions:

- Unit 2 and Unit 3 are at 100% power.
- 2PI5344A and 3PI5344A, Instrument Air Header Pressure, both indicate 95 psig and lowering slowly.
- All available Instrument Air Compressors are running.

Which ONE (1) of the following alarms is consistent with current plant conditions?

A. <u>61B39 - INST AIR DRYER TEMP/LVL/DP HI</u>
B. 50A22 - PZR LEVEL ERROR HI
C. 61B38 - N2 SUPPLY TO INST AIR HEADER ON
D. 58A21 - LETDOWN BACKPRESSURE HI/LO

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		4
	K/A #	G2.4.38	
	Importance Rating		4.0

Ability to take actions called for in the facility emergency plan, including (if required) supporting or acting as emergency coordinator.

Proposed Question: SRO 100

Given the following:

Time	Event
0803	RCS leakage requires entry to AOI.
0807	Leakage quantified to be 36 GPM.
0818	Reactor Trip due to excessive RCS leakage.
0819	SIAS actuated.
0821	Alert declared.
0823	Site Area Emergency declared.

Which ONE (1) of the following describes the LATEST time that you must notify the state and NRC?

	State	NRC
A.	0822	0822
B.	0822	0907
C.	0836	0836
D.	0836	0921

Proposed Answer: D

Explanation (Optional):
A. Incorrect. 15 minutes from declaration. This is 15 minutes from TS LCO exceeded.
B. Incorrect. 15 minutes for TS LCO for state. 1 hour for NRC.
C. Incorrect. 15 minutes for state is correct, but NRC is 1 hour.
D. Correct.

Technical Reference(s) SO123-VIII-10, Step 6.3.1 (Attach if not previously provided)
SO123-VIII-10, Precaution 4.1

Proposed references to be provided to applicants during examination: NONE

Learning Objective: ORP194- (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 5

Comments: